The World's Work

ARTHUR W. PAGE, EDITOR

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TERMS: $3.00 a year; single copies, 25 cents. For Foreign Postage add $1.00; Canada 60 cents.
Published monthly. Copyright, 1914, by Doubleday, Page & Company.
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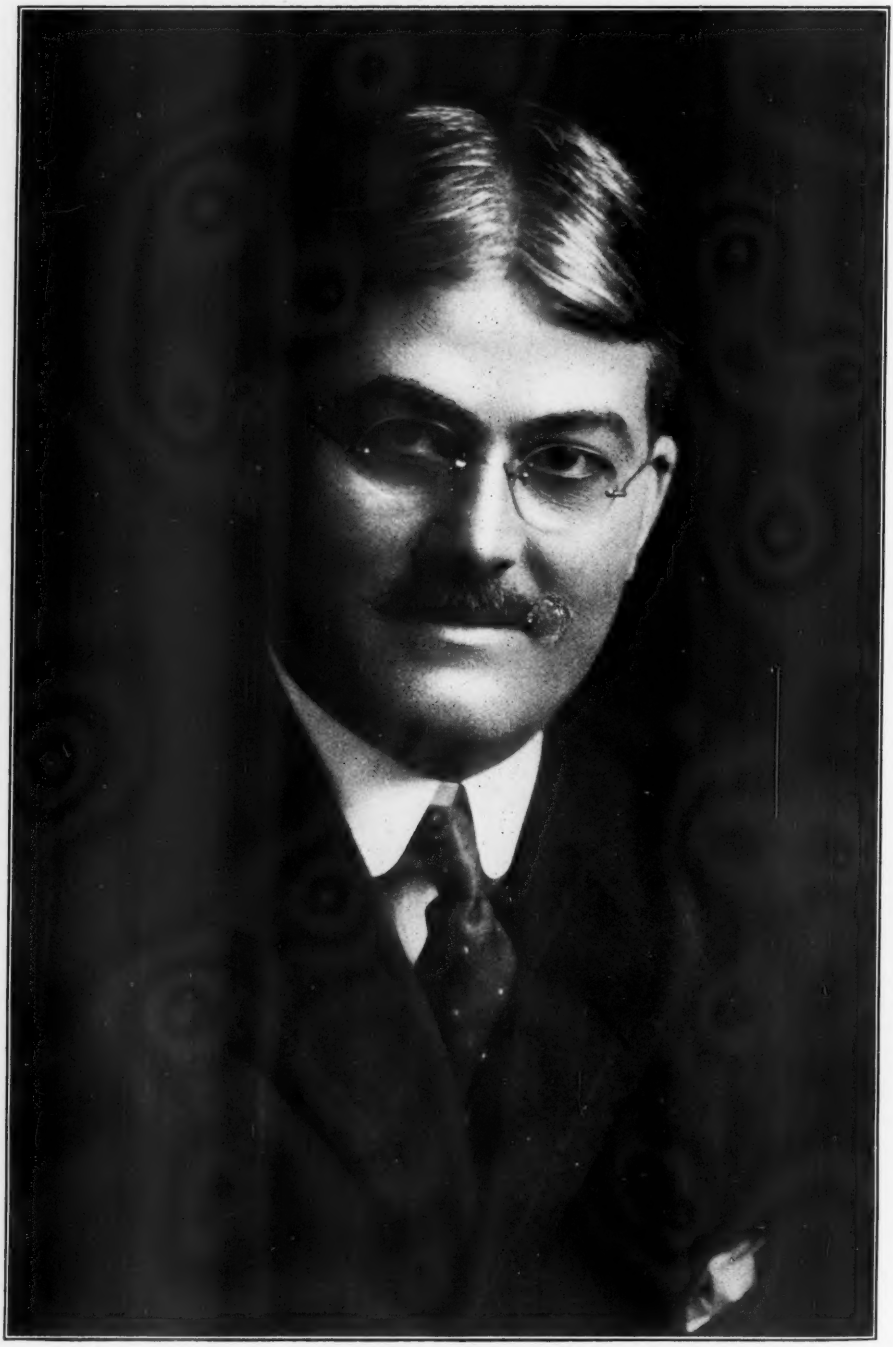
F. N. DOUBLEDAY, President H. S. HOUSTON, Vice-President S. A. EVERITT, Treasurer RUSSELL DOUBLEDAY, Secretary

DOUBLEDAY, PAGE & COMPANY
COUNTRY LIFE IN AMERICA THE GARDEN MAGAZINE—FARMING

CHICAGO: Peoples Gas Bldg GARDEN CITY, N. Y. NEW YORK: 11-13 W. 32d Street



DR. GEORGE W. CRILE

WHO HAS DEVELOPED "SHOCKLESS SURGERY" SO SUCCESSFULLY THAT INJURY TO THE NERVOUS SYSTEM FROM OPERATIONS IS ALMOST WHOLLY PREVENTED AND THAT DEATHS FROM SURGICAL SHOCK, WHEN HIS METHODS ARE FOLLOWED, ARE GREATLY REDUCED

THE
WORLD'S WORK

AUGUST, 1914

VOLUME XXVIII NUMBER 4

THE MARCH OF EVENTS

AUGUST, a political campaign, and business conditions tempered by hesitancy — it is a summer of only mild content and much unrest." This description was written, in 1910, of conditions under a high tariff and a Republican administration. Perhaps it fits to some extent the summer of 1914 under a lower tariff and a Democratic administration. The point is that the "prosperity" and "calamity" argument in politics is chiefly buncombe.

Mr. Cleveland got the blame for the panic of 1893. He had hardly been inaugurated when it occurred. He had not had time to do anything to affect the economic status of the country. If that panic came from political action it was the action of his predecessors.

The only way in which Mr. Cleveland could have affected the situation would have been by the psychological effect of his election. When the panic of 1907 came, Mr. Roosevelt had been President for nearly six years and his party had been in power longer than that. He could, therefore, more properly be charged with the conditions which created that depression than any President of recent times in whose administration such a thing occurred. In the face of his own record his recent criticisms of the present Administration are much like other similar special pleas of adversity by the outs and of prosperity by the ins — in other words, buncombe. In the long run governmental policies are vital to business, and perhaps a very acute analyst of conditions might be able to point to certain beginnings of results soon after measures are passed, but the prosperity and calamity talk engaged in by both political parties now is not of this analytical variety.

The benefits or disadvantages of the Underwood tariff, of the currency measure, and of the trust bills will appear little by little as time goes on. Their passage caused about the same hesitancy which any change causes. To this extent the Administration is responsible for the slowness of business.

But the long-established custom of making the party in power responsible for everything that happens, whether it had anything to do with it or not, has led Mr. Roosevelt to howl calamity and Mr. Wilson to assert prosperity. This summer we haven't either. We are having a fairly slow summer in business with prospects for a better fall.

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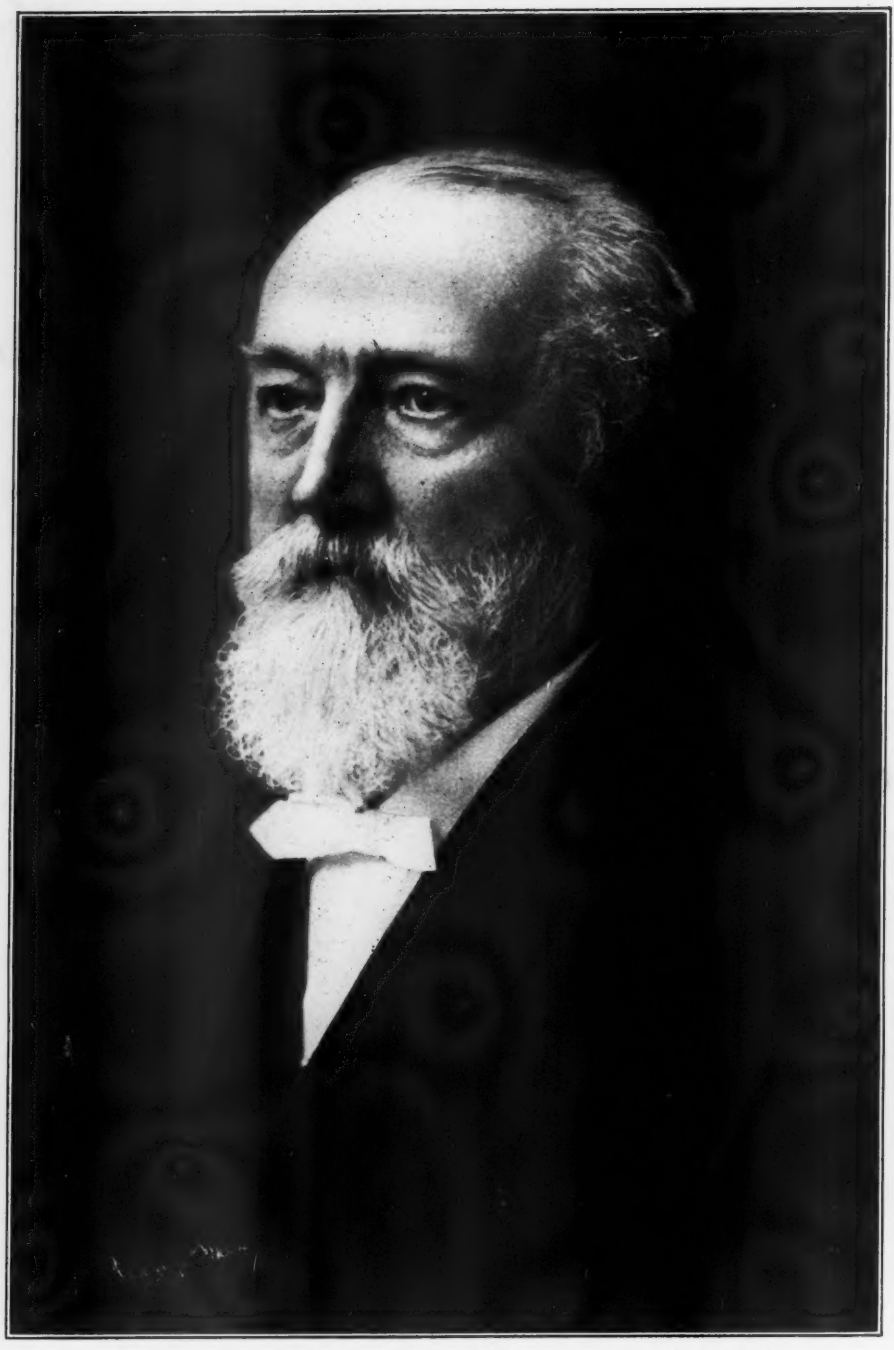
MR. FREDERICK S. CONVERSE AND MR. PERCY MACKAYE

WHO WROTE, RESPECTIVELY, THE MUSIC AND THE BOOK OF "SAINT LOUIS, A CIVIC MASQUE," WHICH WAS PRODUCED RECENTLY BEFORE ENORMOUS AUDIENCES IN THE OPEN AIR ON THREE SUCCESSIVE EVENINGS IN ST. LOUIS AND WHICH ILLUSTRATE NEW POSSIBILITIES OF CIVIC PAGEANTRY ON A GRAND SCALE

[See page 389]

MR. EDWARD KIDDER GRAHAM

WHO WAS RECENTLY CHOSEN PRESIDENT OF THE UNIVERSITY OF NORTH CAROLINA, WHICH, UNDER HIS DIRECTION AS ACTING-PRESIDENT, HAS DEVELOPED ITS EXTENSION WORK AND ITS OTHER SOCIAL SERVICES SO THAT IT IS BECOMING A UNIVERSITY OF AND FOR ALL THE PEOPLE OF THE STATE

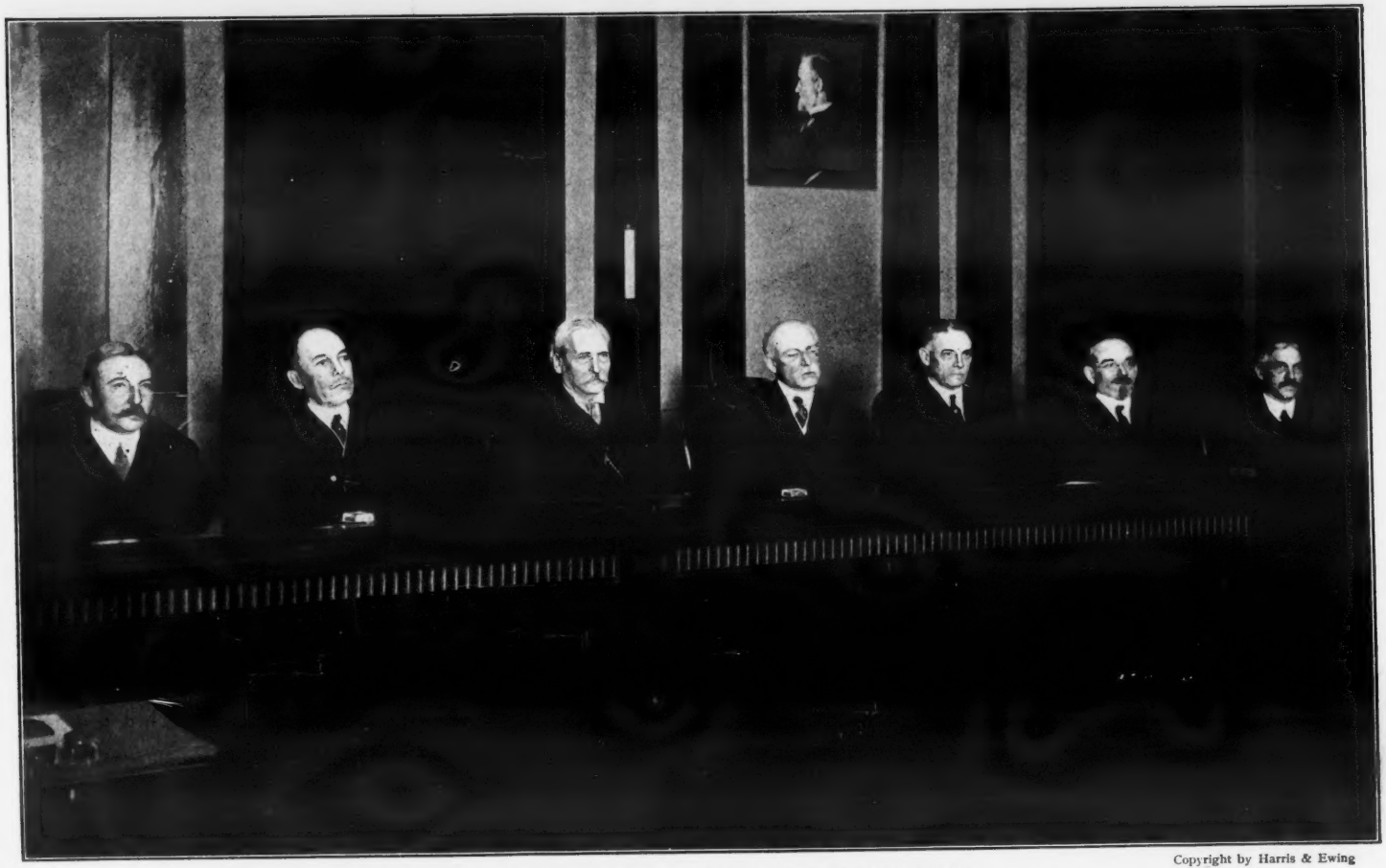


MAYOR RUDOLPH BLANKENBURG, OF PHILADELPHIA

WHO, IN COÖPERATION WITH THE MAYORS OF SEVERAL OTHER LARGE AMERICAN CITIES, IS ORGANIZING A BUREAU OF PUBLIC RESEARCH TO GATHER EXACT INFORMATION TO BE USED AS THE BASIS FOR THE SCIENTIFIC FIXING OF RATES FOR WATER, GAS, ELECTRICITY, AND STREET RAILWAY TRANSPORTATION

MR. O. V. FRY

WHOSE PSYCHOLOGICAL TESTS OF ENGINEERS OF THE PENNSYLVANIA RAILROAD, AT ALTOONA, PA., SEEM TO DEMONSTRATE THE POSSIBILITY OF A METHOD BY WHICH THE CHOICE OF A YOUNG MAN'S LIFE WORK MAY BE RIGHTLY DIRECTED [See page 467]



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THE INTERSTATE COMMERCE COMMISSION

WHOSE AUTHORITY AS A RATE-MAKING BODY HAS BEEN GREATLY STRENGTHENED BY THE RECENT DECISIONS OF THE SUPREME COURT WHICH AFFIRM ITS ACTIONS IN THE SHREVEPORT RATE CASE AND IN THE INTERMOUNTAIN RATE CASE. FROM LEFT TO RIGHT: MR. HENRY CLAY HALL, MR. CHARLES C. McCHORD, MR. JUDSON C. CLEMENTS, MR. JAMES S. HARLAN, CHAIRMAN; MR. EDGAR E. CLARK, MR. BALTHASAR H. MEYER, AND MR. WINTHROP M. DANIELS

[See "The March of Events"]

THE TWO PERSONALITIES IN POLITICS

THE two most interesting subjects in politics are Mr. Wilson and Mr. Roosevelt. Both have impressed their personalities clearly upon the public mind. They are unquestionably the two most able executives whom we have had since the Civil War. They go about the job of being President with more efficiency than their predecessors. Both have a way of getting their ideas straight to the public and commanding a following which has given them a greater ascendancy over Congress than Presidents have had since the early days of the Republic. Mr. Wilson has a more extraordinary record for the seventeen months of his presidency than Mr. Roosevelt ever had in such a length of time, but Mr. Roosevelt maintained his extraordinary power for seven years to such an extent that his enemies clamored he was trying to be king. He has had more public offices and more political experience and more violent friends and enemies than any one else in public life. He probably knows more people than any one else in the country; and the physical buoyancy and courage of the man make a tremendous appeal. The President's quieter, less personal manner would not have gained him anything like Mr. Roosevelt's popularity had it not been accompanied by swift accomplishment. As it is, the very noiselessness of his accomplishment adds greatly to its effectiveness.

The two men are in a large measure contrasts. Even with his precision of thought and speech Mr. Wilson could hardly have dinned the iniquities of bosses into people's ears as Mr. Roosevelt has done. On the other hand, Mr. Roosevelt never eliminated a boss with the swiftness and dispatch with which the President defeated "Jim" Smith of New Jersey even though handicapped by the necessity of putting Senator Martine in the place "Jim" Smith hoped to get.

Once, after a fight in the Philippines, an American officer whom Mr. Roosevelt knew slightly was wounded. The doctors were afraid he would die, for he seemed to care little about recovery. The cable was interrupted at the time, but when it was repaired the first message through was an inquiry from the President of the United States about this officer's health. It made a new man of him, and from that minute he began to pick up. hat was characteristic of Mr. Roosevelt. On the other hand, to see clearly the moral aspect of the tariff question, which Mr. Roosevelt does not believe exists, is characteristic of Mr. Wilson.

Another contrast between the two is in their relations to Congress. Mr. Roosevelt fought the House and the Senate for what he wanted. Mr. Wilson goes to the Capitol and reads his message, and later coöperates with the leaders.

In practically everything they do the methods of the two men are different, and it is not surprising, therefore, that Mr. Roosevelt has already objected to almost everything that the present Administration has done. Nevertheless, the one thing that Mr. Wilson and Mr. Roosevelt have in common is significant of the temper of the times.

Neither Mr. Wilson nor Mr. Roosevelt is radical, nor conservative. They both believe in progress tempered with reasonableness. The radical Democrats would go much further than Mr. Wilson, and the most progressive Progressives are more radical than Mr. Roosevelt. He believes in taking more or less a middle course with all possible enthusiasm. This has led some papers to denounce him as a reactionary while, for the same utterances, others abused him for being a wild radical. He is neither; but a violent advocate of a far from violent programme.

Both Mr. Wilson and Mr. Roosevelt want to progress with reasonable speed, but the directions in which they propose to go differ greatly. Mr. Roosevelt wants a trade commission to regulate interstate trade because he believes that competition cannot be longer effective. Mr. Wilson wants a commission to make competition effective. Mr. Roosevelt wants a tariff commission to adjust tariff duties scientifically to protect American industries. Mr. Wilson believes in a tariff that will, after raising the necessary revenue, pro-

[See "The March of Events"]

CLAY HALL, MR. CHARLES C. MCCHORD, MR. JUDSON C. CLEMENTS, AND JAMES C. DUNLEY, MR. MEYER, AND MR. WINTHROP M. DANIELS

tect the American consumer by allowing foreign goods to compete in our markets.

The two strongest characters in political life, therefore, are progressive though of opposing principles. That in itself, even apart from the characters of the two men, is extremely interesting. Standpatism and extreme radicalism are both in the background, a condition the like of which has not existed for a very long time.

Aside from these two dominant figures the political world is unusually devoid of strong personalities. Mr. Underwood is probably the ablest conservative Democrat. He has an enviable record, yet no great nationwide popularity. Mr. Taft's defeat has taken him out of politics, and Mr. Root is retiring. With the possible exception of Senator Borah, the other figures in the old Republican ranks dwindle in size as the control of power is taken from them.

Among radicals Mr. Bryan is the strongest figure, but his loyalty to the Wilson Administration tempers the radicalism he might otherwise show. In the other party Senator La Follette's collapse in 1912 greatly hurt his prestige.

The defeat of the Republican Party has shorn its leaders of such strength as they borrowed from the fact that they were in office, and the Democrats, so long out of power, have not yet developed many strong personalities. Excepting Mr. Wilson and Mr. Roosevelt, our politics is not now filled with many commanding figures.

THE INTERSTATE TRADE COMMISSION

A FEDERAL Trade Commission is a very different kind of commission from any which we have had before. The Interstate Commerce Commission and the state railroad and public service commissions are bodies created to regulate monopoly. It was because the nature of the railroad and public service businesses was at least partially monopolistic that control by a commission was substituted for control by competition, which it was recognized did not have free play in these fields. The most important duty of a commission regulating monopoly is the fixing of rates or prices.

On the other hand, a Federal Trade Commission is an instrument for regulating competition. It is out of its province to fix prices, for that would tend to limit the competition which it is the duty of such a commission to foster.

It is a new kind of commission, therefore, with aims and purposes that are different from those of the commissions with which we are familiar.

It will be made up presumably of men whose combined knowledge and experience would include business practice, economics, and the statutes governing trade and commerce.

Its work is roughly divided into two divisions: first, getting information, and second, regulating business practices.

In getting information such a commission would do what the Bureau of Corporations does now and also some of the investigating that is now in the hands of the Department of Justice. It would make reports on specific industries for the President or Congress, such as the report Mr. Herbert Knox Smith made upon the oil business when he was commissioner. It would investigate business customs just as the Bureau of Corporations is now trying to find out whether or not it is good public policy to allow a manufacturer to name the retail prices of the articles he makes. Such a commission would also get facts for the use of the Department of Justice in suits under the Sherman Act. In these activities the Commission would be doing nothing new: it would be taking over tasks that are now performed by other agencies.

The one new effort to get the facts of business, that the Interstate Trade Commission might make, is the collection and publication of reports about interstate business similar to the railroad reports published by the Interstate Commerce Commission. Filing these reports has undoubtedly added expense and trouble to railroad administration, but the information gathered has been so valuable to railroad men, investors, legislators, and the public that even the railroads would not do away with the reports if they could.

Reports upon business would be similarly valuable. There is this difference,

however. Trade secrets do not exist in railroading as they do in business. The risks of business are greater and therefore properly the profits to the successful are larger in business in proportion to the amount of the capital invested than in the management of railroads. When, therefore, the facts of business begin to be presented to the public, there is likely to be a good deal of misunderstanding of them. Trade secrets would not be revealed, but private business has been in the habit of keeping its business private, and the enforced publicity would shock a good many, particularly of the old school of business men. The new order of business men are inclined to believe in publicity. It has greatly helped the Steel Trust and other companies. A knowledge of business conditions keeps capital out of unwise ventures, cuts down the amount of unintelligent competition, which is economic waste, and adds a good deal of stability to a trade. One of the motives for combination has always been that manufacturers wished to find out what their rivals were doing. This motive will be somewhat satisfied by publicity without the attendant disadvantages which combination brought.

The regulating powers and duties of an Interstate Trade Commission, however, give it a more direct and greater influence than its duty of collecting information, and it will almost certainly have wide regulating power in the end whether it begins with it or not.

A concrete example of the present method of enforcing the Sherman Act is perhaps the best way of seeing how an Interstate Trade Commission would fit in with it. When the Supreme Court dissolved the Tobacco Trust it was confronted with the difficult question of what to dissolve it into. Consolidations and mergers and the dissolution of previously acquired corporations were so blended in the whole combination that it was impossible to separate them into the original units. The Supreme Court, therefore, decided that, to comply with the law with as little damage as possible to the property, the combination must be dissolved (in the words of Ex-attorney-General Wickersham) "not necessarily into its original elements, but, in effect, to be divided up into a number of separate and distinct integers, no one of which should threaten monopoly . . . The Supreme Court not only empowered but directed the Circuit Court [which arranged the dissolution], in case this lawful condition should not be brought about within a period of six or eight months, either to appoint a receiver of this vast property for the purpose of working out the ordered disintegration; or by injunction to paralyze and end its interstate business."

In a situation of this kind it would be the duty of the Interstate Trade Commission to work out the form of dissolution subject to the Court's approval, the reason for this being that the Commission's understanding of business practice should enable it to divide the combination into more effective units than would the Court.

Further than this there is a provision in the Newlands amendment to the trust measures that the Trade Commission, after a trust has been dissolved, shall watch the progress of the different parts to see that they do not get together again or otherwise break the law — in other words, to see that the dissolutions are effective. This is now, of course, the duty of the Department of Justice.

In these two ways the Commission would supplant and supplement existing agencies. Besides, it is proposed to give it power all its own. If it has reason to believe that a corporation is using unfair competition it shall ask the corporation to show cause why the Commission should not issue a restraining order against it.

A corporation so restrained could take its case to court, just as decisions of the Interstate Commerce Commission are taken to the Supreme Court for review. If not reversed by the Court the Commission's decision would be binding unless the Commission itself should set it aside, or modify it, to meet changing conditions.

There is a corollary to this power, however, which has not been granted in any of the measures introduced into Congress. It is the power to make positive as well as negative decisions. There is need for a tribunal which will tell a man what he

can do as well as what he cannot do. Not long ago a Western business man who was part agent and part competitor with a New York business man went to a former member of the Cabinet and asked if it would be legal to combine the two businesses. There would be certain obvious advantages in the combination (and not all combinations are unlawful) which would make them better able to serve the public and therefore would put them in a stronger business position. The Ex-cabinet member, a lawyer, had to confess that he was not sure whether or not the combination would be legal. The Westerner then went to Washington and inquired of an officer of this Administration if such a combination would be legal. The officer thought it would but he had to confess that his thinking so was no guarantee that the Supreme Court would think so, too, if some one should sue the combination after it was formed. So the Westerner and the New Yorker did not combine, for although they were convinced that the combination was good business and good morals they were unwilling to take the chance of being sued as criminals.

Now, if these two men could have appeared before a commission and explained what they wanted and gotten from the commission an outline of what they could do and what they could not do, their enthusiasm and energy would not have been killed by uncertainty. This is assuming that their combination was proper and for the public good. If not, the commission would have prohibited it. In other words, as conditions are now a man must take the chance of breaking the law, and take his case before the Commission or into court before he can tell whether or not his practices are legal.

The Interstate Trade Commission, then, would take over the work of all the governmental agencies that are now trying to maintain competition in interstate trade except that the prosecution of criminal cases would still be in the hands of the Department of Justice and the decisions of the Commission in all cases would be subject to the review of the courts as the Interstate Commerce Commission's decisions are now.

It should give business a little more knowledge of its own condition, which is always helpful; give the public quicker relief against evil trade practices; and it should also give business a place to find out whether its plans are proper, without having to carry them out and suffer a suit. Such are the reasons and hopes for the Interstate Trade Commission.

"THE WAR ON BUSINESS"

DURING the discussion of the trust measures there has been the natural and habitual plea from those opposed to such measures to stop "the war on business;" and with that plea has been coupled the example of Germany, which gives all honor and encouragement to its trust makers, whereas we threaten ours with fines and imprisonment.

There is in truth a very striking contrast in the point of view of the two governments. The German Government does its best to increase German business, manufacturing, commerce, shipping, everything. While we try to break up a shipping trust the Kaiser is instrumental in getting the Hamburg-American and the North German Lloyd steamship companies to cease their bitter competition. The German Government uses its tariff to help certain industries, and in some cases even changes railroad rates for the same purpose. The idea under this governmental activity is that if German business increases Germany will be prosperous.

The system, of course, leads to favoritism. Not all businesses are large enough or important enough to secure the Government's aid. The big businesses know better what they want than the little ones, and, where great profits can be made by securing governmental favor, of course people seek such favor in all kinds of ways. We used to do it here, not so long ago, by campaign funds. We used to give tariff favors to particular industries, also. Mark Hanna believed in the German idea of a union of business and politics, in which the Government should help business and thereby keep the country prosperous and "the dinner-pail full". In Germany, where the three-class system

of voting is in use, the poorer people have a much smaller voice in the Government than with us. The more well-to-do, who are naturally in charge of the manufacturing and commercial enterprises, control the Government, and the connection between business and government is very intimate. According to the prevailing German view this is all right.

On the other hand, our Government is the special agent of the consumer, in contrast to the German Government's guardianship of the German producers.

In a country of universal suffrage, in a democracy, this is almost certain to be the case, for the men in charge of productive enterprise are comparatively few, whereas every one is a consumer. By looking on all the people as consumers the Government can treat all more nearly alike than when viewing them as producers. And for this reason, despite a protective tariff that lasted for a hundred years and despite many other special aids to business, the conception of the great majority of the American people is that their Government is a government in the interest of all the people on their common ground as consumers. Our Government does not owe any business a living, we do not want it to give any business any particular favors, we are suspicious of any very intimate connection between business and politics because our experience with such connections in the past has been bad.

In the many discussions of business and government and their relations and the many references made to German laws and business practices, it is well to bear in mind that our aims and ideals and theirs are entirely different; that with a restricted suffrage they are trying what our universal suffrage has refused to sanction. It will be increasingly interesting to see the further comparison of the two ideas as time goes. It is a good test of whether all the people have as good economic sense as the few whose superior ability puts them in control of productive industry — in other words, it is a fair test of democracy.

The test will continue. If you choose to call it a war on business, the war will continue. It has been in progress for twenty years or more under all kinds of administrations and will continue whenever the consumers' interests are made subservient to the producers'. Once in a while, as during the Hanna régime, the producers obtained temporary special privileges, but the antagonism which came with them and the "war" in which they were taken away again cost more than they were worth. We are in the process of adjustment all the time, and though that may have its disadvantages it is a far safer and better condition than the German business world, intrenched in privileges, would be in, were the consumers' point of view to come into power there.

There is another cause of the continual "war on business," or process of adjustment. Our common law and our centuries of business training are based upon the actions of human beings, which are limited by human motives. Into these laws and customs we dropped corporate beings granted unlimited powers by the various states. Now the same motives do not always apply to corporate beings that apply to human beings, and laws and customs that are adequate for human beings are not adequate for corporate beings. This situation necessitates a great deal of readjustment, and will continue to do so.

In other words, "the war on business" is a continuous process of adjustment which is a necessity with us. Whenever it is stopped for a while it increases speed later on to catch up. The easiest way for all concerned is to take the adjustment little by little as we go along. Mr. Taft's failure to reduce the tariff gave us a little extra to do this last year, but when the trust measures go through now we shall be up to schedule for a while at least.

A BLOOD TRIBUTE TO BAD CONDITIONS

WHEN it was known that the Archduke Francis Ferdinand, heir to the Austrian throne, was going to visit Bosnia, the Servian Ambassador to Austria advised against it. When this advice was not heeded, he urged that at least the

wife of the Archduke be left at home. But the Archduke and his wife went and both, after having escaped a bomb, were shot. The reason that the Servian Ambassador warned the Archduke against visiting a part of his own dominions was that Bosnia is peopled chiefly by Serbs who are galled by Austrian rule. There are thousands of Serbs also in Herzegovina, in Croatia, and in Dalmatia. Like the Magyars of Hungary, who have struggled against the Germans of Austria to maintain the distinction of their race and language, the Serbs of these provinces (some but newly acquired by Austria), resent the attempts of the Magyars to obliterate their race and language. In this struggle of the Serbs there have been plots, persecutions, and scandals reaching even to the Austrian Cabinet.

The Serbs in the Empire are discontented. Austria looks with suspicion upon Servia as the instigator of this discontent. Servia, on the other hand, having seen the Austrian acquisition of Bosnia and Herzegovina, fears even for its own safety — feared much more before the Balkan War. The Servian armies that were victorious over the Turks and then over the Bulgars were trained and equipped with an eye toward Austria. The Archduke's assassins were not of the variety of assassin that kills to rid the world of the holders of power. It was not power in general, but Austrian power in particular, which they struck at. They were the products of misrule and racial bitterness. The conditions which brought them forth to kill the Archduke and his wife hold the possibilities of further bloodshed. The discontent of the Serb subjects of Austria and the little-concealed dislike between Servia and Austria are a serious menace to the peace and progress of the northern part of the Balkan Peninsula.

In Albania, the revolt against the Prince of Wied is sufficient evidence of the unsettled conditions in this ancient battleground — even without the ludicrous interference of our lately resigned Minister to Greece. The Balkan wars built no basis of peace. Bulgaria looks with hatred upon Turk and Servian alike. Servia has not forgiven Bulgaria for its sudden turning from ally to enemy; and on Servia's northern border is the ever present Austrian menace. Greece, too, is prepared for emergencies. Macedonia is in revolt. Austria and Russia still play their games in the Balkans. And probably the Turk will not be caught so unprepared again. The Near East is still the trouble spot of Europe. The murder of the Archduke is but another tribute exacted by the Balkan problem.

Peace and prosperity are of the soil. They come from the bottom up. They are created by an intelligent, homogeneous people under wise government. Neither the intrigues of great Powers, nor the wars of little ones, nor even the combined wisdom of Europe can parcel out a country so as to make peace and prosperity so long as ignorance, tyranny, and racial antipathy are as prevalent as they are in the Balkans. The task in the Balkans is the long, slow task of educating and enlightening peoples who have been isolated, uneducated, and tyrannized, robbed, and killed for many hundreds of years.

THE BIG TASK IN MEXICO

FUNDAMENTALLY, what is true of the Balkans is true of Mexico, although the two countries contain very different peoples. The task is one of education and enlightenment. Enlightenment comes with schools, with commerce, with railroads. But schools may be used to create a tyrannical oligarchy, and commerce and railroads may be the instruments of exploitation and extortion. Education and commerce must make beneficiaries and not victims of the Mexican people. Of the fifteen million in Mexico at least twelve million are unfit. They are illiterate, and filled with a suspicion bred of ignorance and abuse. The fundamental problem in Mexico is to turn these twelve million from peons into men. This, again, is a long, slow task.

And in the meanwhile who is to govern Mexico, and how? What is there in Mexico to justify the President's patience in giving that country a chance to make a government that will start on this great task? The oligarchy under Porfirio Diaz

did not have this great duty in view, though it was made up of the ablest men in Mexico. Madero did, but he was not strong enough even to begin it. Huerta is less enlightened than Diaz. It is beyond the conception of an illiterate fighting chief like Villa, and Carranza measures up less and less to the needs of the country as time goes on. From across the border the deliverer is not in sight. If, in the course of time, he fails to appear we shall have to supply him, temporarily, in the shape of a United States Army officer, as we did in Cuba.

Yet we have not come to this. One country after another in Latin America has been plunged into anarchy and has emerged. Not only the Argentine, Brazil, and Chile, whose friendly offices have helped us to avoid intervention in Mexico so far, but Colombia and Venezuela have emerged from despotism and revolution to a somewhat higher plane than before. What has happened there may happen in Mexico, if we can manage to stay out of that country.

However, even if the right man does appear, we need not hope for the immediate settlement of the Mexican problem. The way will merely have been cleared to begin the task. The task itself will take many years during which there will always be the possibility of such a critical situation arising as now confronts us. The enlightenment of an illiterate and abused people is a long job. For a foreign nation it is also a thankless job. If we can avoid that task, we shall not only disarm the suspicion of Latin America and maintain in some degree Mexico's friendship, but also escape a difficult undertaking in which there is little honor or profit and much danger and expense.

OUR FOLK-LORE BALLADS

IN A certain rural district in Virginia every year the Negroes gather and act the story of one of the old ballads of the Scotch border. These Negroes picked it up from white people who had it by word of mouth from their ancestors who came across the water with the song in their memories. The ballad has lived for centuries in this country without being written down. Thousands of miles from the place of its origin it holds the attention of the members of an alien race, who know nothing of the conditions or the people among whom the story grew. This is a fair example of the inherent interest in the narratives of these old folk-songs.

In his sixteen years of research the late Professor Francis J. Child found that there were 305 old English and Scottish ballads. Professor Child noted incidentally that some of these ballads — he found seventeen — were current in the United States. A year and a half ago Professor C. Alphonso Smith, of the University of Virginia, organized the Virginia Folk-Lore Society to find what of these old ballads are current in Virginia, and the United States Bureau of Education is lending its aid in starting similar societies elsewhere. So far, in Virginia, chiefly in the mountain counties, fifty-six of the ballads have been discovered. In the hills of Virginia these old songs still pass from father to son and from mother to daughter, songs which for vigor of narrative, vividness of portraiture, simplicity of style, and fulness of content are not surpassed in the history of American or English song.

So far, more of these ballads have been found in Virginia than elsewhere, but that is probably chiefly because they have been sought there more diligently. They are known to exist in Maine, Massachusetts, New York, Pennsylvania, in the Carolinas, and even in some parts of the West. It is high time that they were collected and preserved so that they may become a part of our life, for we come by them honestly, and we have nothing else so good to take their place.

THE INTERMOUNTAIN RATE CASE

IN THE decisions handed down by the Supreme Court just before its adjournment, there was a very striking endorsement of the work of the Interstate Commerce Commission. And the decisions of the Commission thus endorsed were of themselves of wide significance. The decision in the Shreveport Case declares

that interstate rates are more important than state rates and that, therefore, no state can set its boundaries up as a barrier to commerce for the benefit of its manufacturers or merchants. The Intermountain Rate Case opens the way for the Interstate Commerce Commission to deal with rates in a more comprehensive way than heretofore.

The Intermountain Rate Case grew out of a former practice of the railroads in charging on commodities carried westward to intermediate points in Washington, Nevada, and Arizona — the Intermountain territory — higher rates than were charged on similar commodities that were destined to points on the Pacific Coast.

The railroads contended that they were justified in charging more for the shorter than for the longer haul, because on the through traffic they came into competition with the steamship lines operating from coast to coast, and had, therefore, to meet very low rates on that traffic. When they got a shipment of goods for one of the intermediate points not subject to such competition, it had been customary for them to treat it as if it were to go first to the Coast, and then back to its destination; and to fix the charge accordingly by adding the local rate to the through rate. For example, shipments from New York to Phœnix, Ariz., would pay the transcontinental rate from New York to San Francisco and the local rate from San Francisco back to Phœnix.

In an earlier decision, in 1911, the Interstate Commerce Commission partly admitted the contentions of the railroads. The Commission decided, however, that a readjustment of the old rates ought to be made. It reasoned that the ocean competition which the railroads were compelled to meet grew less as the territory in which the traffic originated was farther and farther removed from the Coast and on that basis worked out a compromise arrangement. It decided, for example, that on traffic originating in the zone bounded on the east by an imaginary line drawn through St. Paul, no higher rates might be charged to intermediate points than to points on the Pacific Coast; but that on traffic originating in the zone between St. Paul and Chicago 7 per cent. more might be charged; and so on through different zones until a maximum of 25 per cent. increase was provided for on traffic originating east of Pittsburg.

Subsequently the Commerce Court, which has since been abolished, was called upon to review this decision and it finally held that the Interstate Commerce Commission was without authority to fix rates in that way. But the Supreme Court settles the question by ruling that the Commission has full authority under the Interstate Commerce Act.

The chief significance of the Supreme Court's decision in these cases lies in its assertion of the Commission's right to make what are known as "blanket" rates according to its own judgment. It had previously been supposed that its authority in matters of rate making did not extend beyond prescribing rates in particular instances where the existing rates were found to be unreasonable.

Railroad men are practically unanimous in the opinion that the effect of the "Intermountain" decision will be to reduce materially — at least until rates can be readjusted — the revenues of the transcontinental lines.

It puts them, also, in a less favorable position to meet the increased ocean competition which is expected to develop after the opening of the Panama Canal. But they are hopeful that they may be able to convince the Commission of the propriety of advancing many existing rates, which, as they believe, are less than reasonable, and thus compensate for much of the loss that will be suffered meanwhile.

Moreover, the power, thus newly found, to make blanket rates, added to the power given in the Shreveport Case, puts the Commission in a position to handle rate questions on a broader basis than heretofore when it was restricted to deciding on the fairness or unfairness of a particular rate after some one had complained of it. By one decision of the blanket rate type it can accomplish as much as by twenty decisions about specific rates.

THE SUPREMACY OF INTERSTATE COMMERCE

A FEW years ago the merchants of Shreveport, which is an important commercial centre in northwestern Louisiana, were enjoying a thriving trade in eastern Texas. There they came in competition principally with the merchants of Dallas and Houston. In time this rivalry grew so strong that it became of serious concern to the merchants of Texas, and prompted them to look around for some means of saving for themselves the business which was going in increasing volume over into Louisiana. They found, as they believed, that the basis of the Shreveport merchants' successful competition was the rates which the railroads were charging to carry the goods.

Accordingly, the matter was laid before the Texas Railroad Commission, and that commission ordered a readjustment of rates on traffic within the state. The new schedule placed the merchants of Louisiana at a great disadvantage. For example, under this schedule a rate of 60 cents would carry first class traffic eastward from Dallas into the competitive territory a distance of 160 miles; whereas, under the schedule that was maintained by the railroads on interstate traffic, the same rate would carry goods into Texas from Shreveport only 55 miles.

The merchants of Shreveport believed that this was unjust discrimination, and they protested to the legislature of Louisiana, which in turn instructed the railroad commission of that state to seek relief from the Interstate Commerce Commission. The latter upheld the merchants of Shreveport in their contention of discrimination, and told the railroads that they must not continue to charge higher rates on commodities moving from Louisiana into Texas than were charged on commodities moving equal distances from Dallas and Houston toward Shreveport.

But the Federal Commission did not say whether the railroads should establish equality by lowering the interstate rates from Shreveport, or by raising the intrastate rates from Dallas. Both had been upheld as reasonable by competent authority. So, to find a way out of their perplexity, the railroads appealed to the Commerce Court, which decided that the discrimination against Louisiana might be removed by raising the rates on Texas traffic. However, the railroads, to make a complete test, challenged the validity of this decision before the United States Supreme Court.

This is the history of the Shreveport, or Texas-Louisiana, Rate Case, which was settled by the court of last resort early in June. By this final decision, handed down by Mr. Justice Hughes, the rulings of the Interstate Commerce Commission and of the Commerce Court are upheld. It is settled that no state may undertake to shut itself in commercially, and throw artificial protection around the business of its citizens, by fixing on railroad traffic within its borders rates which are injurious to interstate commerce. This is a reassertion of the theory of our Constitution referred to by Commissioner Lane in the original report on the Shreveport Case that "a state may not live to itself alone, either politically or commercially."

The Supreme Court is careful in this decision to point out that Congress, through the Interstate Commerce Commission, does not possess the authority to regulate the internal commerce of a state. But it does possess the power to protect interstate commerce, even to the point of regulating rates within state boundaries whenever their indirect effect upon commerce that is moving to points beyond is to set up discrimination against shipping centres outside the state. This was the point for which the railroads contended in the Minnesota rate cases that were decided in June, 1913. It was denied then, however, because the court held that there had been a failure to show discrimination. In the Shreveport Case, this phase of the controversy had been investigated and determined by the proper authority, the Interstate Commerce Commission.

The Shreveport rate decision has been welcomed by the railroads of the country generally, because it has settled the supremacy of the authority of the Federal Government over that of the forty-eight

states, where the two are in conflict. Thus a great deal of confusion will be avoided in the future, and at least a semblance of order brought out of the chaos of unwise and conflicting decrees relating to many important phases of railroad operation.

AMERICAN BANKS IN FOREIGN FIELDS

THE National City Bank of New York is the first to take advantage of the new freedom given to our commerce and finance by the Federal Reserve Act. The directors of the bank have authorized its president to apply to the Federal Reserve Board for permission to open branches at Buenos Ayres and Rio Janeiro. The bank plans to establish branches and agencies to help the export and import trade of the country.

The old National Bank Act prohibited the creation of branches of national banks. The Federal Reserve Act removes this prohibition. Moreover, it also allows banks which are members of the Federal reserve system to deal in drafts or bills of exchange against exports or imports, and to discount such drafts at the Federal reserve banks, and these Federal reserve banks can deal in foreign bills of exchange in the open market when they see fit.

There is no special privilege in these provisions of the new Act. They merely allow American banks to do what has been customary for foreign banks to do; merely set commerce and finance free.

But this liberation will mean a great deal in our newly awakened effort for world markets. American exporters heretofore have usually had to do business through German or English or some other foreign banks. These banks are closely allied with the German or English or other foreign competitors of the American exporters. This has put American trade under a great disadvantage, for it is as hard to compete against banking discriminations as it is against railroad rate discriminations.

As our banking institutions grow abroad, our exporters will find themselves as well served as their competitors, which will be a tremendous help to them in the struggle in which up to now they have been greatly handicapped.

AN IMPROVED RECLAMATION POLICY

THE Reclamation Service, as every one knows, has for some years been engaged in irrigating and settling large tracts of public lands and incidentally some private lands in the West. The funds for its operation have been derived, in the main, from the sale of public lands in the Western States.

The Service has done great benefit to the dry regions, a benefit which will grow more apparent as time goes on and the settlement of the irrigated lands works itself into permanent form. As the Government has to treat every one alike, it is prevented from selecting its settlers. Consequently, many who are doomed to failure must be allowed to take up farms, and the prosperity of the projects is delayed until these incompetents fail and move away. This, and the fact that the Government has done the work without local financial assistance, has led to criticism from Western people. People are rarely satisfied with things which are done for them in which they do not share the responsibility and cost. It is a wise policy, therefore, which Secretary Lane has begun, of asking the aid and coöperation of the Western States in reclamation work. It is likely not only to increase the funds available for the work but also to decrease criticisms thereon. Oregon has appropriated half the money necessary for the investigation of possible projects on the Deschutes River and in central Oregon. Washington and California have made appropriations for similar purposes. These are all good signs of a new spirit in the work.

TO KEEP OUT SOUTHERN ITALIANS

IN THE four years, 1910-1913, 821,000 Italians came to the United States. Comparatively few of them came from the north of Italy which now, as in historic times, furnishes the brains and ability of Italy. What we get is chiefly

the undersized, illiterate overflow from half medieval Naples and Sicily.

According to Professor Edward A. Ross, writing in *The Century Magazine*, among our foreign born the Italians "rank lowest in ability to speak English, lowest in proportion naturalized after ten years' residence, lowest in proportion of children in school, and highest in proportion of children at work." He continues:

> Steerage passengers from a Naples boat show a distressing frequency of low foreheads, open mouths, weak chins, poor features, skew faces, small or knobby crania, and backless heads. Such people lack the power to take rational care of themselves; hence their death-rate in New York is twice the general death-rate and thrice that of the Germans. No other immigrants from Europe, unless it be the Portuguese or the half-African bravas of the Azores, show so low an earning power as the Southern Italians. . . .
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> If it be demurred that the ignorant, superstitious Neapolitan or Sicilian, heir to centuries of Bourbon misgovernment, cannot be expected to prove us his race mettle, there are his children, born in America. What showing do they make? Teachers agree that the children of the Southern Italians rank below the children of the Northern Italians. They hate study, make slow progress, and quit school at the first opportunity. While they take to drawing and music, they are poor in spelling and language and very weak in abstract mathematics. In the words of one superintendent, "they lack the conveniences for thinking." More than any other children, they fall behind their grade. They are below even the Portuguese and the Poles, while at the other extremity stand the children of the Scandinavians and the Hebrews.

Added to all this they have the worst criminal record of all the peoples that come to our shores.

It is time that we stopped this influx either by a general law excluding undesirables or by a law aimed specifically at the Southern Italians, similar to our immigration laws against Asiatics.

The theory on which this Republic rests is that every child shall get an education and every man a chance in life. But a chance is not sufficient to make a useful citizen out of a man "without the conveniences for thinking." An increase of Southern Italian labor means necessarily an increase in paternalism, for they cannot take care of themselves. They are a direct menace to our Government because they are not fit to take part in it.

THE DEATH TOLL OF FOG

A LITTLE more than two years ago fog caused the loss of the *Titanic*. One thousand five hundred and ninety-five people were drowned in that disaster. Last winter the coastwise steamer *Monroe* was run down in a fog off the Virginia Capes and forty-one people lost their lives. On May 29th the *Empress of Ireland*, outward bound, was rammed by the collier *Storstad* in the St. Lawrence River in a fog. In this disaster the death toll was 1,024. On June 13th, in an early morning fog off the Massachusetts coast, the Hamburg-American liner *Pretoria* struck the American liner *New York*. Only the ready seamanship of Captain Roberts of the *New York* prevented any loss of life. Four days later the British hospital ship *Maine* went ashore in a fog off the coast of Scotland and, though aid summoned by wireless saved the lives of the patients on board, the ship was almost a total wreck. On the same day the *Kaiser Wilhelm II* and the *Incemore* collided in a fog in English waters and both had to put back to port. On the next day, which was still foggy, the North German Lloyd *Buelow* ran on the rocks of the English coast, as did also two private yachts, one English and one American, and the steamship *St. Nicholas*. In the meanwhile the Hamburg-American *Etruria* and the English steamer *Copsewood* collided in the English Channel. On June 23d, the Red Star *Gothland* struck on Gunner Rocks, near the Scilly Islands of England, in a dense mist. The next day, the *Esperanza*, a large power yacht, ran on the shoals off the coast of Connecticut.

The sea lanes are crowded with ships, many of them under great commercial pressure to make speed. The ever increasing number and speed of the ships add to the dangers which fog has always brought at sea; and up to the present our naval construction and sailing practices have not adequately met this added danger. Fog horns, wireless, and the ordinary submarine bell all are useful, but all to-

gether seem inadequate. There is, therefore, every reason to look with interest upon the efforts to perfect a wireless apparatus that will record the distance and direction of other ships or land wireless stations and the effort, already successful, to use wireless telegraphic signals under water as described by Mr. Burton J. Hendrick elsewhere in this magazine.

A STORY ABOUT SAWDUST

WE are coming to realize more and more that it is harder to reach a fairly efficient standard of distribution than it is to attain a good standard of production and that our selling deficiencies still set a limit to our ability to make things. There are many fertile spots in the United States in which the farmers are hampered in the use of their land because of their inability to market any but a few staple crops. Even in sections where marketing facilities are supposed to be well developed there is opportunity for striking improvement.

For example, the grape growers of California have recently enlarged tremendously the possibilities of their market. They have learned how to ship grapes half way around the world and to sell them in competition with the grapes from Southern Europe. Last winter an experimental shipment was exported to England and sold in the London market. Several thousand drums or barrels were sent to the West Indies and South America. They sold abroad at prices fully equal to and sometimes in excess of the prices paid for Spanish Almeria grapes.

The secret lies in the method of packing; the Californian grape-growers have discovered that coarse redwood sawdust is a cheap and effective substitute for the granulated cork that is used in packing the Spanish grapes.

Three years ago they decided that something must be done to take care of the product of the increasing number of vineyards. Under existing conditions it was necessary to market the greater part of the Californian grape crop within six weeks or two months after picking, and any great increase in output during such a limited season meant a glutted market and low prices. The area over which the fruit could be distributed in sound condition was limited.

The coöperation of grape growers and governmental investigators led to an improvement in both package and filler which has greatly lengthened the period of storage and so extended the radius of possible shipment. Practically all the Californian grapes have been marketed in splint baskets inclosed in slatted crates. The new package is a tight drum of thin cottonwood, lined with heavy strawboard. The smaller size will hold about eleven pounds of grapes, and the larger, thirty-three to thirty-six pounds. The filler used is a coarse redwood sawdust, cleaned of dust and slivers. It has been demonstrated that this sawdust is as effective as cork, if not more so. The prices paid for grapes thus packed are sufficiently high to cover the additional cost.

In addition to grapes exported, the new method resulted in a larger domestic sale. The shipments from the San Joaquin Valley to the principal markets of the United States and Canada increased in 1913 to seventy carloads, or twice the amount shipped in 1912.

For many years the public has been interested in the success of agricultural scientists in developing more prolific varieties of plants. This will, of course, continue, but with it will be linked stories of deep significance woven around such things as sawdust filler, eggs and berries by parcel post, varieties of packing, distribution agencies, and the like.

THE OTHER FIFTY CENTS

USUALLY when we spend a dollar about half of it goes for the raw material and the labor that are used in making the article we purchase. The other fifty cents is what we pay for having it sold to us. Wholesalers, retailers, transportation agencies, and advertising mediums divide it, sometimes in one combination, sometimes in another. The great struggle in our commercial life is to reduce that fifty cents. Of course, the selling cost is not always exactly 50 per

cent. of the retail price. In some articles it is more, in others less, but on the average it is certainly not much, if any, less than that. A more or less dim realization of this fact has led to a popular outcry against the middleman, as if he had created this selling cost entirely for his own benefit. The truth is he is the victim of conditions much as are the rest of us. He is not in control of the situation. In many places and in many trades he is having a difficult time to make a living.

In our more primitive industrial days the many little manufacturers who could not afford to bear the burden of a sales force that could reach the scattered retail stores which sold their goods sold to wholesalers. By combining a great number of articles from different manufacturers the wholesalers and jobbers, or middlemen, were enabled to support selling agencies that could reach all the retailers in their territory. The retailers in turn sold to their immediate localities. This was the best machinery that could be devised at that time, and for many parts of the United States it still is.

But in later days our efforts to cut down the cost of distribution have injected many new elements into the machinery of distribution. Mail order houses are competing with the local retailers. Large manufacturers with their own agencies are also invading their field. Other manufacturers whose volume of business warrants it have ceased to deal with wholesalers, and now deal direct with the retailers — or else sell to both. Retailers with a chain of stores have established wholesale departments for themselves, and wholesalers have established retail stores for themselves, and some wholesalers have gone into the manufacturing business. Our whole machinery of distribution is in a state of flux and every producer realizes that his chances of salvation depend upon getting his goods from his factory to the consumer with as little expense as possible. This is the problem of the high cost of living.

We have not much accurate data on this subject. Every manufacturer struggles with his own problems, or at best discusses them only with the other members of his trade. We could profit by more extended and scientific investigations. The science of selling offers a great field for study for the Department of Commerce and for the many business schools which are springing up in our colleges. Commerce is not mere money-getting. It is a science, as banking and law and medicine are sciences. It should be studied as such, for with such study comes not only greater efficiency but a higher standard of ethics as well. There is no more pressing public service to be done than the discovery of the best ways of reducing the cost of distribution and of elevating business to the standards of a profession.

A UNION OF BUSINESS AND POLITICS

A NEW and interesting example of the spirit of progress which now animates our towns and cities is the plan adopted by Beaufort, S. C. Beaufort has about 4,000 inhabitants, and it has been in the habit of getting along like other small towns with an underpaid town government and a Board of Trade whose activities are hampered by lack of funds. But the town has now decided on a new régime. Its plan is to have a city manager to carry on the town's business and a paid secretary to do the Board of Trade's work and to have them one and the same man. The town and the Board of Trade between them can afford to hire a good man and both jobs do not involve more work than a good man can handle.

In a large city, where the city government's activities are not easily kept track of, this combination of business and government might lead to complications. The other interests of the town might be overshadowed by its commercial efforts. But in a small city where mouth to mouth publicity is nearly automatic, there is not much danger of the town's welfare suffering at the hands of trade.

In other ways the Beaufort plan seems to offer many advantages which might well be copied by other small towns whose business men are public spirited enough to join their contributions to the public taxes to get a good man to take care of the public affairs, municipal and commercial.

WHAT ABOUT PAYING ASSESSMENTS?

HE WAS one of the most sorely perplexed investors whom any financial adviser was ever called upon to try to help. He lived in Pennsylvania. About two years ago, he said, he had made his first venture into the market for securities by putting a substantial part of his savings into the preferred stock of a large public utility company, which was then bidding actively for the favor of the investing public. In doing so, he had taken thought of the element of chance, which he realized was present in all business. But he liked the idea of making in that way such contribution as he was able "to help his richer brother," as he said, "keep the wheels of production in motion."

The company in which he had decided to become a small stockholder was not a mushroom affair. It had been in existence for more than twenty years, had paid dividends practically from the start, and, so far as could be made out by a man of average ability to judge such things, it bore every earmark of financial stability. Moreover, it had the backing of bankers who appeared to be resourceful, and seemed to enjoy the confidence of investors. So he had felt that the element of chance in this particular enterprise was small.

Things had gone along all right for about a year, when the investor began to hear disturbing rumors about the condition of his company. Close upon the heels of those rumors came the announcement of the appointment of receivers, and it was then that he had learned for the first time about the interest of the company and its bankers in a number of vast undertakings so extremely venturesome in their very nature that, as he afterward declared, he would not have required the wisdom of a financial Solomon to discover in them the possibilities of the public utility company's undoing.

It was in this connection that the investor admitted he had been remiss. He had not gone far enough in his investigation. Still, he felt that the sponsors of the investment had not been entirely sincere, and his resentment had increased when he had found it difficult, during the time the company was in the hands of receivers, to find out where he stood. He had come, at last, to feel that perhaps this was the way of all business — to put it squarely up to the man who invests his savings to discover for himself in every case the seaworthiness of the financial ship. And he believed that this was wrong — that the attitude of those in control of big business toward the small stockholder ought to be an attitude of "more responsiveness and more responsibility."

However, there was a phase of the matter in which his concern was more immediate. A reorganization plan had been agreed upon. He thought that it had perhaps as much chance as any plan could have to cure the business disease of the company, as it had been diagnosed by the experts, even though it should fail to cure him of the shock of destroyed confidence. One part of the plan called for a further contribution from him in the shape of a large assessment on his stock. The question was, should he take another chance? Would it pay to put more money in?

That question is the point of this story. It is a pertinent question now because so many corporations of necessity either are undergoing or are about to undergo financial reorganization of the kind which puts upon the shareholders — and in some instances upon the junior bondholders, too — the burden of supplying the millions of new capital that they require.

The common need of all these companies is immediate cash, which must come, for the most part, from the pockets of those security holders whose stake upon the successful outcome of reorganization is greatest. They are the stockholders, the proprietors, the sharers of the profits when profits can be made.

Thus it is that so many investors have

before them now the dilemma of assessment: "Will it pay?" Scores are asking the question in much the same spirit of hopelessness as the investor of the story. Unfortunately, it is a question to which the most careful analysis of facts and circumstances rarely results in producing anything like a definite answer. In considering the question, the important thing to be borne in mind is that assessments are as a rule compulsory in the sense that security holders who refuse to meet them are denied participation in the reorganization, and therefore in whatever subsequent prosperity may result from it. But no earthly means have yet been found to calculate possible future prosperity.

It seems timely, however, to remind investors who are thus perplexed that many people have lived to regret that they did not pay their assessments. Here is an almost tragic case in point, as recalled the other day by a veteran banker:

An acquaintance of his had been an investor in the stock of the old Northern Pacific Railroad, which fell upon financial difficulties and was placed in the hands of receivers during the panic year 1893. Progress toward reorganization was hampered by a long series of bitter personal struggles among officers and directors, and in the eyes of the holders of thousands of shares of stock the company's difficulties had thus been unduly exaggerated. So that, when an agreement was finally reached in 1896 upon a reorganization plan which called for assessments on both the preferred and common stocks, there were many dissenters who decided to get out rather than pay up.

Five years later occurred the memorable "Northern Pacific Corner," an incident to the contest between two powerful syndicates for control of the road, which had again been restored to prosperity. One day, the investor's widow, while reading a newspaper account of the events of that period of excitement, happened to remember that she had once seen among her husband's effects some kind of a document relating to Northern Pacific. She brought it forth, and was able to make out that it was a certificate for a hundred shares of stock. She hastened to a broker and told him she wished to sell. The price was at that time rapidly climbing toward a thousand dollars a share. But, alas, for her it all meant nothing. Her certificate proved to be worthless. The assessment had not been paid.

That was, of course, an exceptional case. Yet there were hundreds of investors in the stocks of other leading railroads — such as the Santa Fé, the Baltimore & Ohio, the Reading, and the Union Pacific — that went through receiverships in the gloomy years between 1893 and 1898, who felt the sting of similar disappointment. It is, for example, not difficult to imagine what might be the feelings to-day of investors in the stock of the old Union Pacific who, when given the opportunity to participate in the reorganization of 1897, could see nothing but the immediate necessity of paying the unwelcome assessment of $15 a share, and who allowed their holdings to lapse for that reason. A study of these big assessments reveals the fact that the stockholders who were gifted with a sufficient amount of imagination to see possible values ahead found early encouragement. For the shares of all these roads were quoted in the open market within six months after reorganization at prices nearly equal to the assessments and previous market quotations combined.

It can scarcely be denied that these experiences of the past are reassuring in many ways. But from them it does not necessarily follow that present security holders in Rock Island, Wabash, St. Louis & San Francisco, or any of the other companies with dark records of failure which they are trying to obliterate, may expect like success to attend the efforts of the reorganizers. To meet whatever assessments may be called for is the only chance these investors have, but only time can tell whether it will pay to take it. The owners of these stocks should be reminded, however, to look at both sides of the question — to realize, first, that unless the assessments are paid they forfeit all chance to share in possible future profits, and, second, that if the assessments are paid they are paid to help a struggling enterprise that may or may not survive.

THE NEW MORALS OF ADVERTISING

HOW THE ASSOCIATED ADVERTISING CLUBS OF AMERICA HAVE HELPED TO CLOSE THE DOORS OF NEWSPAPERS AND MAGAZINES TO QUACK MEDICINES, FRAUDULENT SALES, AND OTHER VICIOUS ANNOUNCEMENTS — THE "STANDARDS OF PRACTICE" ADOPTED AT TORONTO — MAKING THE BUSINESS OF ADVERTISING A SCIENCE AND A PROFESSION

BY

HERBERT S. HOUSTON

A SWIFT and sure transformation is in progress in the great business of advertising. And oddly enough it is being wrought so quietly that the public knows little about it. The reason is that the transformation is coming from within the business itself.

The patent medicine man in print is coming to be nearly as rare as the patent medicine man on street corners. To-day the bill boards bear patriotic lessons from the life of Grant or the manger story of Bethlehem, instead of the flaring and often indecent announcement of the burlesque show. What has happened, anyway? The change has come upon us as quietly as the gentle rain from heaven. But behind it and through it is one of the big, dynamic movements of modern times.

Ten years ago a group of advertising clubs that had existed independently in several cities formed the Associated Advertising Clubs of America. Each of these clubs was, and has continued to be, the centre of advertising interests in its community, its membership being made up of the merchants, publishers, advertising managers and writers — of every one in any way connected with advertising. Each of these clubs had worked alone, in its own field and in its own way, to improve advertising conditions. Then the spirit of coöperation brought the units into a strong organization that has worked with surprising success and that has accomplished surprising results. To-day this organization is composed of 128 clubs with 12,000 members, besides having 14 departments, representing different advertising interests. In Toronto the annual convention of this many-sided organization has recently been held. There came to attend it several thousand men from every state in the Union and from Canada, with a fair representation from abroad.

If Goldwin Smith could have lived to see this great gathering in his adopted city he would have felt, doubtless, that it presented many bewildering paradoxes. Every one that attended it was in business, yet the spirit manifested throughout the proceedings was not commercial but ethical. This was the message of the two first addresses, by Dr. J. A. Macdonald, editor of the Toronto *Globe*, and Sir Edmund Walker, on the 100 years of peace among English-speaking peoples; and it continued to be the message, repeated in innumerable ways by President Woodhead and through nearly two hundred addresses and papers that followed.

To the superficial listener this ethical quality might have been attributed to mere oratorical fervor, but it would not have required a Goldwin Smith to discover quickly that this view was far afield. There was substance to the ethical message, more than sound. Convincing proof of this was given before adjournment by the adoption of definite ethical codes in each department, called Standards of Practice. These were clear-cut pledges of upright business conduct. For example, the standards adopted by the department of retail advertising — they were drafted by Mr. Manly M. Gillam, for many years the advertising manager for John Wanamaker — began with this broad pledge: "Each head of a retail enterprise should

dedicate his best efforts to the cause of business uplift and to this end should pledge himself to the following standards." In the ten pledges are such things as these: "To permit no wilful misrepresentation of merchandise; to see that comparison values in printed announcements are with prices previously prevailing in his store, unless otherwise distinctly stated; to resent strenuously — to the point of withdrawal, if necessary — the 'make up' of his advertising in a newspaper next or near announcements offensive to good taste or of a debasing nature; to urge on newspapers that the same care should be shown in admitting advertising to their columns that would be shown in admitting news matter." In the standards adopted by the magazine department the magazine publisher committed himself "without reservation, to the Truth emblem of the Associated Advertising Clubs of America; to ceaseless vigilance to see that every advertisement he publishes shall measure up to that Truth emblem; to definite statements and to independent audits showing the quantity and distribution of his circulation;" and to other things on a high plane of business ethics that were equally definite.

And the newspapers, the bill board advertisers, the trade paper, farm paper, and religious paper publishers — indeed, all the departments — adopted standards of practice that measure up to the same high level. At the convention in Baltimore a year ago the organization adopted a business creed that was commented on generally as a broad programme of commercial righteousness. But it was a general declaration of principles. At Toronto this creed was translated into the definite terms of practice. And it is this practical, structural reformation of advertising from within that is the significant thing in the movement.

Instead of waiting for the pressure of public opinion to effect changes; or for such an investigation as that which was made in life insurance several years ago, or as the recent New Haven Railroad inquiry; or for any other outside influence, it was apparent that advertising was cleaning its own house, with quiet and thoroughgoing efficiency.

The Vigilance Committee reported through its chairman, Mr. Harry D. Robbins, of the banking house of N. W. Halsey & Company, that, due largely to the activity of the clubs, honest advertising laws had been enacted in the following 19 states: New York, Oregon, Massachusetts, Ohio, Minnesota, Washington, North Dakota, Colorado, Pennsylvania, New Jersey, Nebraska, Iowa, Indiana, Michigan, Idaho, Connecticut, Alabama, Rhode Island, and Wisconsin, and that a Federal statute was pending in Canada, as well as a Federal statute before Congress in the United States.

LAWS FOR HONEST ADVERTISING

These laws have been modeled to a considerable degree after a statute that was prepared by *Printers' Ink*, and in six states this precise statute has been adopted, as follows:

> Any person, firm, corporation, or association who, with intent to sell or in any wise dispose of merchandise, securities, service, or anything offered by such person, firm, corporation, or association, directly or indirectly, to the public for sale or distribution, or with intent to increase the consumption thereof, or to induce the public in any manner to enter into any obligation relating thereto, or to acquire title thereto, or an interest therein, makes, publishes, disseminates, circulates, or places before the public, or causes, directly or indirectly, to be made, published, disseminated, circulated, or placed before the public, in this state, in a newspaper or other publication, or in the form of a book, notice, hand-bill, poster, bill, circular, pamphlet, or letter, or in any other way, an advertisement of any sort regarding merchandise, securities, service, or anything so offered to the public, which advertisement contains any assertion, representation, or statement of fact which is untrue, deceptive, or misleading, shall be guilty of a misdemeanor.

REFORM BY MORAL SUASION

Mr. Robbins also reported that during the last year 648 cases had been reviewed by the vigilance committees of local clubs. Of these, 379 cases were successfully handled by moral suasion. During the year only 42 cases in the various states were actually brought to trial, and of these 24 resulted in convictions, 6 were lost, and 12 are still pending.

But this collective activity of the clubs represents only a small part of the definite results that are coming in connection with this stimulating commercial movement. Publishers themselves are seeing to it, without direct suggestion or pressure from the clubs, that their advertising columns are kept clean. The magazine publishers led the way in this independent cleaning up about ten years ago. Largely through the leadership of their organization, the Quoin Club, they individually set up standards that excluded whisky advertising, all get-rich-quick or speculative advertising, and patent medicine advertising, and they adopted the policy of immediately eliminating the announcements of every advertiser who treated their readers unfairly.

HOW THE "TRIBUNE" CLEANED UP

The newspapers in all parts of the country are being stirred up to their responsibilities, in many cases through the advertising clubs, and many of them have set up unusually rigid and high advertising standards. The Chicago *Tribune* in the last year or two has established an especially strict censorship. Among the things it excludes are loan sharks, fake furniture sales, medical advertising, dentists, doubtful financial and land advertisements, speculative financial advertisements, stock propositions offering extravagant returns, fake clothing and raincoat sales, and whisky advertising.

Mr. William H. Field, the business manager of the *Tribune*, says that during 1913 the combined advertising printed by three other Chicago papers that the Tribune refused amounted to 3,705 columns but that, notwithstanding this loss, the *Tribune* showed a gain of 3,936 columns of advertising over the preceding year. It would seem that a clean advertising policy is likewise a profitable advertising policy.

A TUSSLE WITH THE QUACKS

One of the most dramatic contests of the year has been in New Orleans. A few years ago three young men, Messrs. Thomson, Ballard, and Newmyer, got control of the *Item*. It carried practically every kind of advertising that a newspaper ever carries. The young publishers set their faces to the front and began a gradual clean-up. Last October they went to the point of setting up an advertising censorship of the most rigorous kind. Mr. Ballard, the editor of the paper, is a graduate chemist from Johns Hopkins University, and his wife (Dr. Edith Lober) is a graduate of Cornell and Tulane universities and one of the best known woman physicians in the South. They have acted as a medical board for the paper and all "copy" for advertising that was under contract at the time the censorship was established was carefully read, every remedy was tested, and a complete written report was made on every case. If the copy was objectionable the advertiser and his agent were notified that it was objectionable under certain rules, a set of which was enclosed with the letter. In most cases advertisers admitted their guilt by silence. Others wanted more details. Then duplicates of the medical reports were mailed. Some argued their cases and some threatened suits. When this was done the *Item* printed the entire correspondence as a feature story, with the report of its medical board. Lawyers and special pleaders for "proprietary associations" called on the paper and they were all told to use the libel court route if they felt they had been damaged. However desperate the threats were, thus far not a single suit has been filed. The *Item* threw out 119 contracts amounting to $35,000. Mr. Newmyer, the business manager, says that contracts amounting to more than $10,000 have been offered and declined and that the income from special editions, a particular form of advertising abuse in the South, would have amounted to $25,000 more, and that thousands of dollars' worth of business has been withheld by those who definitely fought the paper's policy. Mr. Newmyer believes that the total of these losses amounts to $100,000, and yet he writes to the WORLD'S WORK: "Does it pay? Does it pay to be honest? Man alive — to look all your home town squarely in the eye and know that they know you're on the level, even if they don't agree with you — to know that 60,000 faithful followers are

fighting with you — to know that eventually all publishers will be forced to follow — to be a leader — does it pay? And there is proof that it pays. To-day every high-grade advertiser, local and national, using a New Orleans paper, uses the *Item*. Contracts we couldn't reach came in voluntarily. Our advertising revenue was never greater and our net profits never more satisfactory."

On January 1, 1913, the Minneapolis *Journal* announced its refusal to accept any more patent medicine advertisements which might be considered at all objectionable. The *Journal* began to publish full pages, clipping patent medicine advertisements from its leading rival. This started a vigorous editorial fight between these two papers, which had a good deal to do with calling the attention of the public in the Northwest to the movement for clean advertising. While this controversy was progressing, the Advertising Club of Minneapolis, under the leadership of its vigorous president, Mr. Mac Martin, got a bill through the legislature of Minnesota and on March 11, 1913, it was signed by the governor. On the following day every advertiser in the state received a letter from the Vigilance Committee of the club containing a copy of the law and asking for assistance in its enforcement. On Easter Sunday, 1913, the club placed a full page advertisement in all the papers in Minneapolis, calling the attention of the public to the law and asking coöperation in enforcing it.

SCARING ADVERTISERS INTO HONESTY

The effect of this law on the state was immediate and widespread. Milliners burned their Paris labels and announced to the public that they would not again sell hats made in the United States with anything but their own or the original manufacturer's label. The effect of the law and the moral sentiment that was built up supporting it were so strong that the Minneapolis Club has only had four cases to refer to the courts. The first was dismissed after the president of the company came with hat in hand to give absolute assurance of satisfactory future conduct. The second was never tried, as the assignee who was conducting the alleged fraudulent sale fled from the city; the third case was lost on a technicality but the business of the offender was immediately closed up; the fourth case, that of a horse-trader, was won and the offender fined half of the maximum penalty with a warning from the judge that a second offence would put him behind the bars.

THE MAILS THE REFUGE OF THE SHARKS

All this activity has demonstrated that most advertising is honest and dependable and that the relatively small amount of the other kind can speedily be done away with. Strangely enough, as magazines and newspapers have set up their high standards and denied their columns to the unreliable advertisers, the latter have found their only place of refuge behind the protecting postage stamp of Uncle Sam. Denied access to all reputable publications and to bill boards and street cars and practically every other form of advertising, the swindlers and fakers now carry on their business chiefly through the mails. For years the Sterling Debenture Corporation was unable to have its advertising published in any medium of standing; but all the time it carried on a far-reaching propaganda by mail and sold millions of dollars of worthless stock. At the advertising convention in Boston three years ago the advertising clubs unanimously passed resolutions calling on the Government to protect the public more rigorously by denying the use of the mails to swindlers.

But the advertising club movement is not concerning itself merely with the question of clean advertising. It has been quite as much interested in efficiency as in truth. Because of its interest in efficiency it has carried forward during the last four years, under the direction of an Educational Committee, a wide-reaching educational programme. Lecture courses and study courses are followed by a great majority of the clubs. The Educational Committee has begun the publication of books that it hopes to have accepted as the authorities in the field of business and advertising. Last year it published "Advertising as a Business Force," by Prof. Paul T. Cherington, of the School of Business Administra-

tion of Harvard University. At Toronto it announced two more books for publication this fall: "Advertising — Selling the Group," by John Lee Mahin, of Chicago; and "The New Business," by Harry Tipper, president of the Advertising Men's League of New York. Professor Cherington's book has been brought out in England, in Spain, and in Australia, and an edition is being arranged for in Germany. The profits from the sales of these books sustain the educational work among the clubs.

ADVERTISING AND THE COST OF LIVING

The Educational Committee has seen that a business which in America calls for an expenditure every year of double the cost of digging the Panama Canal must fully justify itself to the public. Naturally so vast a sum raises the suspicion that it may have some part to bear in the high cost of living. Advertisers challenge this suspicion and point to the fact that advertised articles have maintained the same price levels, despite the general tendency to higher levels, and they say that this has been possible through larger sales secured by advertising. The Educational Committee is surveying this whole subject and it announced at Toronto that during the coming year it would add to its activities the work of a committee that would seek to make all the public know how it is being served through advertising. The first movement in this work is a lecture by Mr. James Schermerhorn, publisher of the Detroit *Times*, on "Advertising — The Light that Serves and Saves." This lecture is illustrated by moving picture films and by stereopticon slides and will be given the coming year by the advertising clubs of the various cities before women's clubs, churches, societies of various sorts, and in every other place in which it can have a proper hearing.

The club movement has adopted as its emblem the word "Truth," superimposed on a map of North and South America and surrounded by the words, Associated Advertising Clubs of America. This was done through the Publicity Committee, which has carried on a broad campaign, advertising the annual conventions as great business gatherings, in the main, but also advertising the Truth emblem and emphasizing its significance.

MAKING ADVERTISING A PROFESSION

The club movement, which has so much definite work to its credit, has had the good fortune to have effective leadership, especially under its last three presidents, Messrs. Dobbs, Coleman, and Woodhead. The movement has now spread to England. A few months ago the Associated Advertising Clubs of Great Britain were formed into a national organization with 3,000 members. Plans are under way for a similar organization in Germany. In all these clubs the ethical standard that has been raised in America is maintained. Though advertising is considered as a business its practice is fast being transformed into a profession, with the code and standards and training of a profession. The Educational Committee of the clubs is interesting colleges and universities in adding courses in advertising to their schools of business administration. New York University has been the first to establish a full four-year course. Several institutions have a course of two years and the University of Wisconsin is undertaking to train better merchants and better salesmen through the University Extension work. The Small Town Advertising Club work, which is part of the educational activity of the club movement, is doing the same thing. It is seeking to make retail merchants more efficient.

The sum total of all this activity, whether ethical or educational, is aimed at making every element in advertising and in selling more effective and therefore more economical. That, after all, is the big meaning to the public. The cost which the maker of an article has to meet in reaching the ultimate consumer is the cost that has to be lowered. Every one agrees on this point. The Advertising Clubs are convinced that they are going to reduce the cost item represented by advertising, and thus become, in a very definite way, servants of the public.

THE PAGEANT AND MASQUE OF SAINT LOUIS

TWO MAGNIFICENT OPEN AIR SPECTACLES THAT FIRST PORTRAYED AND THEN SYMBOLICALLY INTERPRETED THE HISTORY OF ST. LOUIS BEFORE AUDIENCES OF FROM 50,000 TO 125,000 PEOPLE — AN ARTISTIC AND FINANCIAL TRIUMPH OF PAGEANTRY ON A GRAND SCALE

BY

GEORGE P. BAKER

IN THE last days of May, pageantry proved triumphantly in St. Louis what this drama of the masses may do for the masses. Within a few years there have been many pageants in different parts of the United States, but with the exception of those at Quebec and Philadelphia they have been, in numbers involved, relatively small. We have had few pageants commensurate in size with the well-known performances at Warwick, York, St. Albans, and Winchester, England. We have regarded 1,500 performers and an audience of 10,000 people as pageantry in the large. The Pageant and Masque of St. Louis used 6,000 performers before audiences of from 50,000 to 125,000 people. Obviously, such numbers must have created special problems in text, staging, seating, and policing. All these St. Louis met with success.

All this vast artistic effort came from the enthusiasm of one person, Miss Charlotte Rumbold, who ultimately served as executive secretary. Believing strongly that St. Louis should have a pageant, undaunted by lack of understanding or indifference at the outset, she gradually won to her cause a group of representative citizens who became devoted and competent workers on the various committees which any pageant necessitates. To write and direct the Pageant and Masque, these organizers summoned Mr. Thomas Wood Stevens, who wrote and staged the Pageant; Mr. Percy MacKaye, who wrote the Masque; Mr. Joseph Lindon Smith, who was stage director of the Masque; and Mr. Frederick S. Converse, who wrote the music for the Masque. With so many committees and so many directors and authors involved, one had a right to expect some confusion, but the opening performance went with a smoothness which testified to extraordinary coöperation on the part of all concerned.

In all pageantry the site is of first importance. In this instance it was chosen and developed with skill. Many visitors to the World's Fair in St. Louis will recall in Forest Park the semicircular slope stretching gently down from the Art Building to a crescent-shaped lagoon about fifty feet wide. On the opening night, the crowd began to gather early for the performance announced for 6:30. This was necessary, for half of the forty-five thousand seats were free to those who came first. Quite properly, only on this condition would the city permit the sale of seats in this public pleasure-ground. Clear across the front of several hundred feet stretched two rows of boxes. These were about thirty-five feet back from the lagoon. Behind these, far, far up the hill to the Museum ran the rows of seats, none higher in price than $1.50, and many of them to be had for 25 cents. The policing had been so admirably arranged that the foot passengers scarcely once crossed the path of the automobiles, and night after night these vast crowds dispersed with far less crowding and discomfort than one constantly experiences in our theatres. The ushering was in the hands of the Boy Scouts, who managed the overconfident, the misinformed, and any excited late-comers with a firmness, sureness, and tact that must have converted any doubting Thomas as to the Boy Scout movement. Taking one's seat, one faced a stage about three hundred feet long by

about a hundred deep, built out a little over the lagoon on the farther side. On three sides, walls of wood, perhaps sixty feet high, shut in the stage. These were masked with canvas, painted to represent the crumbling walls of Aztec temples. At centre stage, and elsewhere at right and back of stage, were huge mounds with steps leading to their tops. Across the centre ran similar maskings to shut off the space where chorus and orchestra were concealed, the former of about three hundred voices, the latter of a hundred instruments. From the centre and around the ends of this masking were entrances, as well as at upper stage left and at lower stage right. Each wall ended in a tower at the front of the stage. From these the spotlights were directed upon the stage, and from them the directors of the performances, with their aids, guided the action. Scattered about the stage stood curiously-shaped flat scenes painted to suggest shrubbery and trees. In the Pageant, from time to time, these were opened out into the huts of the early settlers, stockades, defences, etc. Huge spotlights on the Museum's roof also played upon the stage.

A TRIUMPH OVER DOUBT

On the opening night, as the audience slowly gathered, it was clear that the public was curious and interested, but not at all sure just what kind of entertainment lay ahead. The free seats were promptly filled, and steadily the rows of standees deepened. But the public in the seats which had been on sale came exasperatingly late. Indeed, it kept on coming till the Pageant was nearly two thirds over. And with that cheerful disregard of the rights of others, to be observed everywhere in late comers to our theatres, it chatted and talked loudly as it tramped down the wooden aisles between the spectators and the stage. The prevailing atmosphere was that of a crowd out for an evening of social pleasure of which the dramatic entertainment was only a part, to be praised if praiseworthy, but which could not spoil the evening if it did not amount to much. Unfortunately, the early hour for beginning made it inevitable that the break between the Pageant and the Masque should be the supper hour. Obviously, this public had not as yet acquired the German habit of combining theatre and supper without detriment to either. Even their interest in the Pageant could not make them quiet down rapidly as the Masque opened, and much of the first part of the latter was consequently inaudible. However, before the evening was over — and at this first performance the Pageant and Masque with their entr'acte took from 6:30 to 11 o'clock — the significant history, the beauty revealed to eye and ear, had the desired effect. Most of those who had to go early went quietly without talk. Many of them tip-toed their way, looking back as they went. There could be absolutely no doubt, before the evening was over, that beauty of thought, stirring historical event, and interpretative imagination had won out against misunderstanding, indifference, and idle curiosity. There was something very inspiring in that.

A GREAT POPULAR SUCCESS

From that first night, the Pageant was a popular success and an artistic education. On the afternoon of the third day, as I rode through Forest Park at 4:30 o'clock, a steady stream of foot passengers, nearly a mile long, was passing in from one side for the performance to begin at 6:30 o'clock. A similar crowd was probably coming from the opposite direction. Thousands of automobiles came in just before the performance. The numbers mounted steadily from about fifty thousand on the first night to one hundred and twenty-five thousand on the third night and later.

THE PAGEANT

Promptly at half-past six on the first night an Indian High Priest with two acolytes came up over the great mound near the centre of the stage, and the Pageant began — in full daylight. In brief episodes, now of verse, now of prose, now of pantomime, the older Indian civilization gave way to the newer; De Soto and his followers came and passed on their way exploring; Marquette and Joliet paddled in canoes round the curve of the lagoon at the left. After they had passed, La Salle

and his mixed party of French and Indians returned, this time in canoes. Quickly the voyagers rebelled against going into the unknown, and as quickly La Salle quelled their rebellion. As La Salle cried, "Forward," the voyagers, taking up their packs again, returned to their canoes and paddled slowly out of sight at the right of the stage. Then an Indian prophet chronicled the passing of the Indian before the coming of the white man, an interlude before the Second Movement. The latter busied itself with brief scenes, closely following history apparently, concerning the founding of St. Louis, its control successively by French and Spanish, and the ultimate taking over of the post by the Americans. The third movement concerned itself, after some cuts, with the visit of General Lafayette, the return of the volunteers from the Mexican War of 1845, the prominence of the Germans in the early life of St. Louis, and finally a series of scenes connected with the election of Lincoln, the tidings from Fort Sumter, and the news of peace. As the stage, filled with hundreds of people, was given over to cries of delight and merrymaking, the music ceased, the lights disappeared — and the Pageant was over.

A TRIUMPH OVER DIFFICULTIES

The Pageant had many difficulties to overcome. It must be brief, since it was not to occupy the entire evening. If it was to review the whole history of St. Louis it must, therefore, outline rather than present dramatically certain famous historical scenes. It must be acted upon a stage of heroic proportions when the history of St. Louis is filled rather with opportunities for delightful characterization than with heroic circumstance. Again and again a spectator longed to be nearer the Pageant that its details of action and characterizing lines might have their full value. For its best effect, it should have been on a smaller stage in closer relation to the public. That it held its public night after night and won much praise shows how well Mr. Stevens met his task.

The Pageant was realism in episodes. With the Masque came symbolism, unified and clarified by the figure of Saint Louis passing through it. In sweep of imagination, in fitness for required conditions, I doubt if Mr. MacKaye has done anything better — particularly in Part 1. That was largely and richly conceived, broadly and dramatically executed. It contained many a moment memorably thrilling or memorably artistic. To quote from its stage directions:

"Out of complete darkness mysterious music rises, prelusive to the appearance of a visionary scene on the plaza. There, before the central mound (as the music continues, descriptive) Spirits of the Mound-Builders perform the ceremonies of a prehistoric ritual. Dimly seen in the darkness of the vast stage is an ancient temple of the Maya civilization — a concrete expression of the religion of the great race of red men of Yucatan and Central America. The temple is to some extent a replica of the famous Chichen-Itza, one of the greatest masterpieces of architecture of this wonderful period of art in the Western world.

"Into the scene comes a great procession, suggesting the symbolism and imagery of the race.

"Heroes and gods, priests and priestesses, dancers and musicians walk solemnly across the great plaza before the temple — a brilliant spectacle, exotic and unique, flooded in the warm glow of sunset light.

"While the priests perform a ceremony at the altar in front of the great mound, above which towers the shrine of the temple, groups of men, boys, and girls give expression in dance to the religious inspiration and embodiment of strength and grace; and when the climax of the dance is reached, the vision fades — the lights grow dim, night steals on, and only the glow of the altar fire remains."

WONDERFUL STAGE EFFECTS

I had found the journey from New England to St. Louis in late May hot and grimy, but such beauty as this opening scene revealed when staged by Mr. Joseph Lindon Smith offset amply any discomfort. I cannot too highly praise Mr. Smith's staging throughout the Masque. At will, his lighting had brilliance, mystery, suggestion. He is a master in handling

masses of soft coloring and in subordinating detail to larger effects. His balance in handling his stage is perfect. Never did he crowd one part of it to leave great spaces empty. Never did he distract the attention by groups of equal interest in different parts of the stage. However scattered his figures might seem to be, there was focus of effect.

From that first beautiful scene of the Masque as Mr. Smith treated it, I got something of the delight which only parts of "Sumurun" had previously given me. Slowly and with exquisite rhythm, figures, walking, swaying, dancing, filled the great stage, coming one hardly knew from where. And as it filled from the right in Indian file, with right arm extended before them and right knee raised high like figures in Assyrian bas-reliefs, came the Boy Scouts, clad only in breech-clouts, their bodies stained a yellow brown. On they came, slowly, rhythmically, endlessly. The delight to any pageant master in seeing numbers represented, not by tens or scores, but by hundreds!

THE POETRY OF THE MASQUE

"Now in total darkness the mood of the music, changing, sweeps to a wild burst of brass and wood-winds, mingled with rolling thunder. Simultaneously, as from mid-air, appear on the tops of the towers two vast male figures, vaguely illumined — Hilóha and Noohái, the Elements of Heat and Cold." And splendid figures they were in their sudden revelation. As the stage grew lighter, "a colossal masked form, garbed like an Aztec Indian priest, appeared midway up the great mound at centre stage — Cahókia."

This huge figure of Cahókia was so arranged that the person speaking from behind it could move the head and arms in life-like fashion. We watched Cahókia, the great god of the ancient Aztec religion, answer, as the voices of the Elements called about him, or as the Wild Nature Forces, dim crouching forms with beast-like heads and bodies, fawned and fretted. And then, after one of Cahókia's speeches, high up over all, outlined by electric lights, appeared Wásapêdan, the Great Bear. Then, too, the stars burst into their chorus, poetically and musically one of the best things in the Masque:

> Wásapédan, the world is dim,
> The way to beauty is far — is far,
> And man, whose soul is a climbing star,
> Man, our brother — O, comfort him.

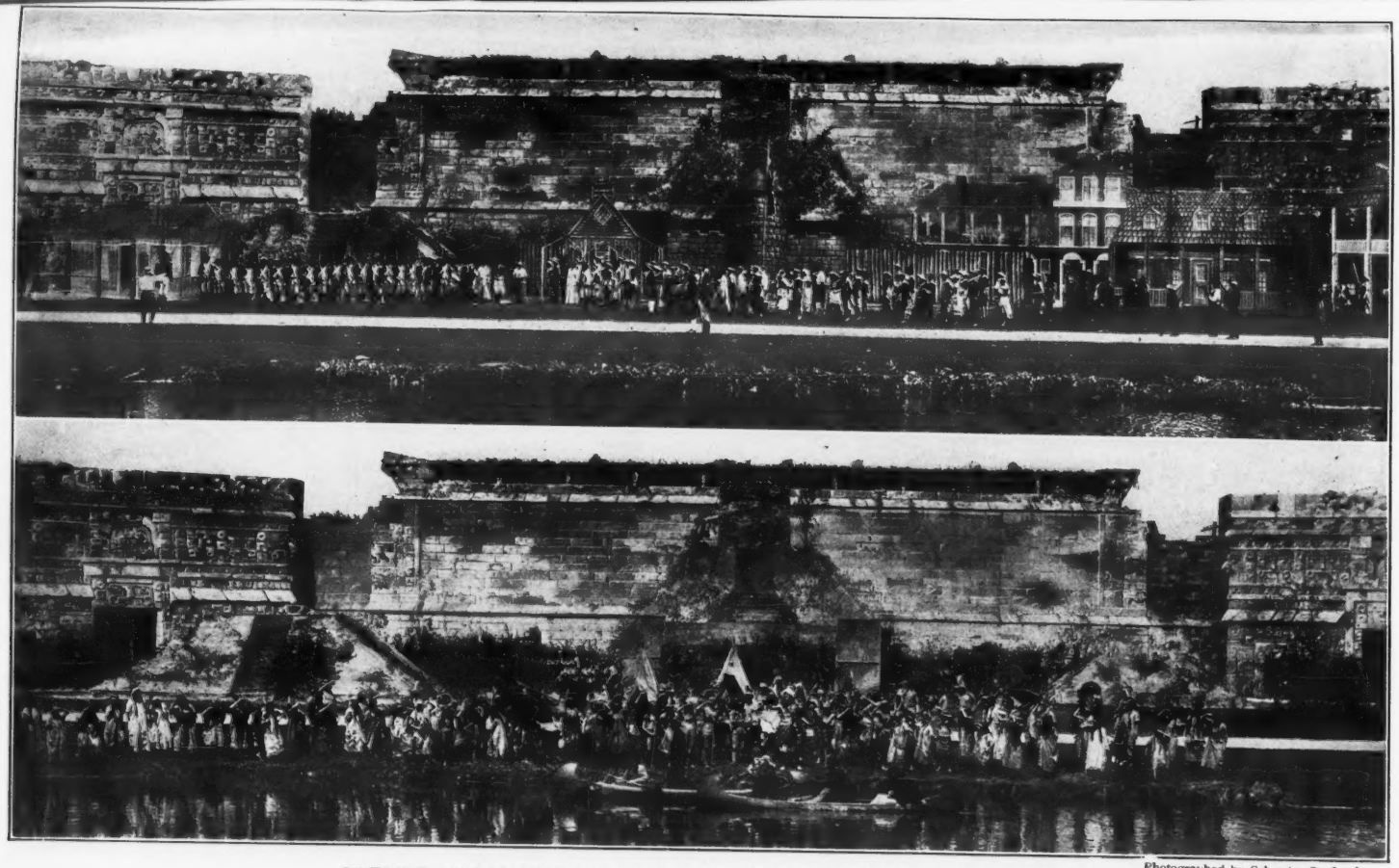
Shortly after came another memorable moment, when Wásapêdan from his lofty outlook announced to Cahókia that the Father of Waters "brings now the white child." Slowly, majestically, up the lagoon at left of stage came a great canoe. Before it the water in the half-light seemed to break into foam, but as it drew nearer one saw that the foam was really the white arms and legs of youthful swimmers drawing the boat after them. High in the prow stood the figure of Mississippi. In the stern, aloft on a litter of rushes, stood a little golden-haired child, beside him a great sword shining with light. Swinging, gliding, accompanied by the splash of the swimmers and the chanting of those within and without the boat, the canoe came on and paused at the edge of the stage.

There was another fine moment when the tiny figure of the child, after slowly climbing the many steps to Cahókia's feet, unaffrighted, nestled between his vast knees. Purity, fragile but unafraid, resting against ignorance and consequent evil of vast proportions — that was the symbolism we saw. When the Wild Nature Forces had surged in vain around the little figure, Wásapédan was heard announcing the coming of a new group. Then, with rich allegory of costume and grouping, figures came up the lagoon bringing the Christian religion. Can any one fail to see that as all the figures on the stage and those newly come burst into the "Veni Creator" there was a splendid climax? As the stage emptied and Cahókia, Wásapédan, and Saint Louis were left alone, only the solemnity of their parting messages and the sweet high treble of the child's

> I hark, I hark — and will remember

prevented an anti-climax as the old religions and beliefs faded into darkness.

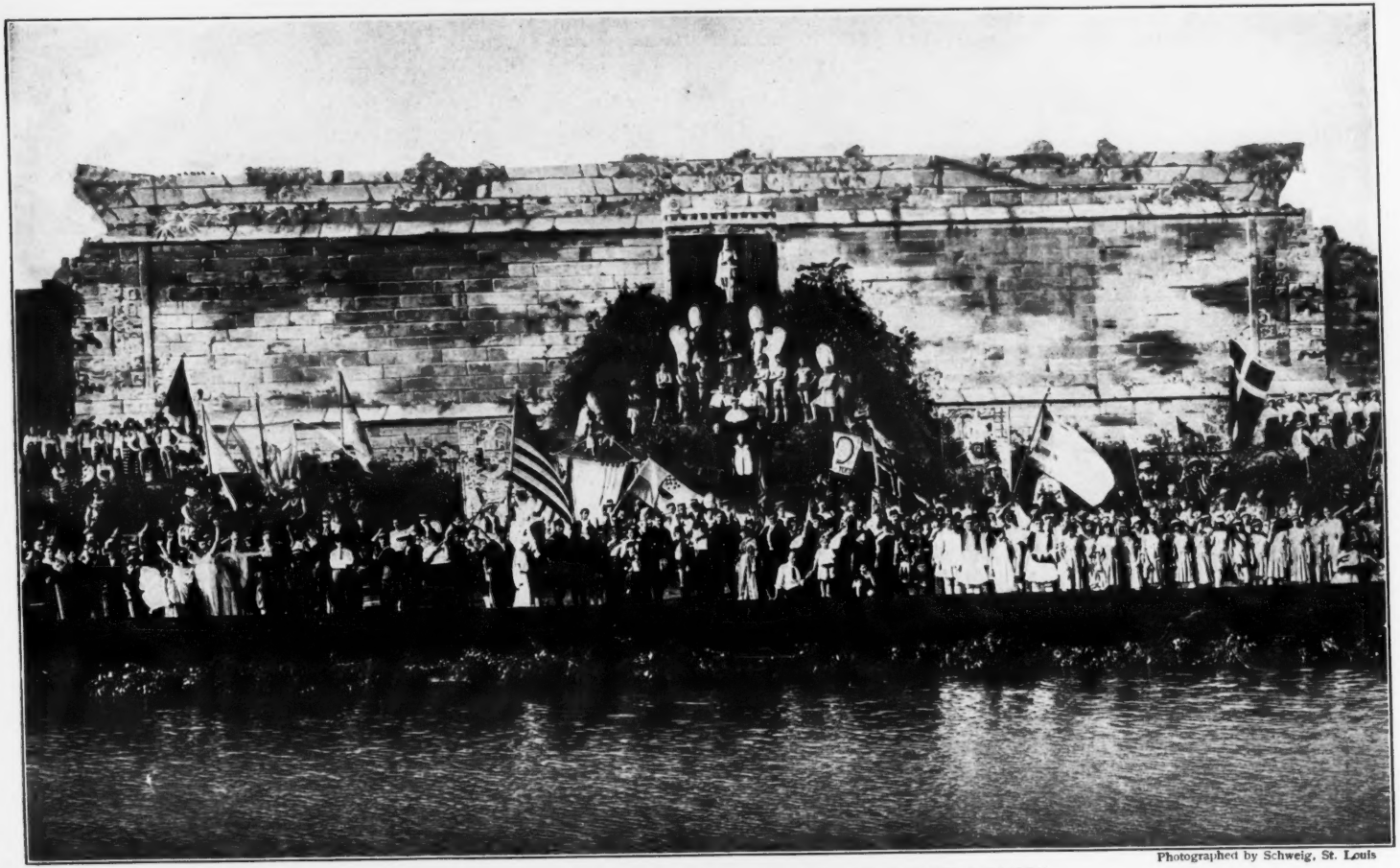
Of the beauty of the Interlude one can get little idea in reading the text, for here the imaginations of Mr. MacKaye and



Photographed by Schweig, St. Louis

SCENES FROM THE PAGEANT OF THE HISTORY OF ST. LOUIS

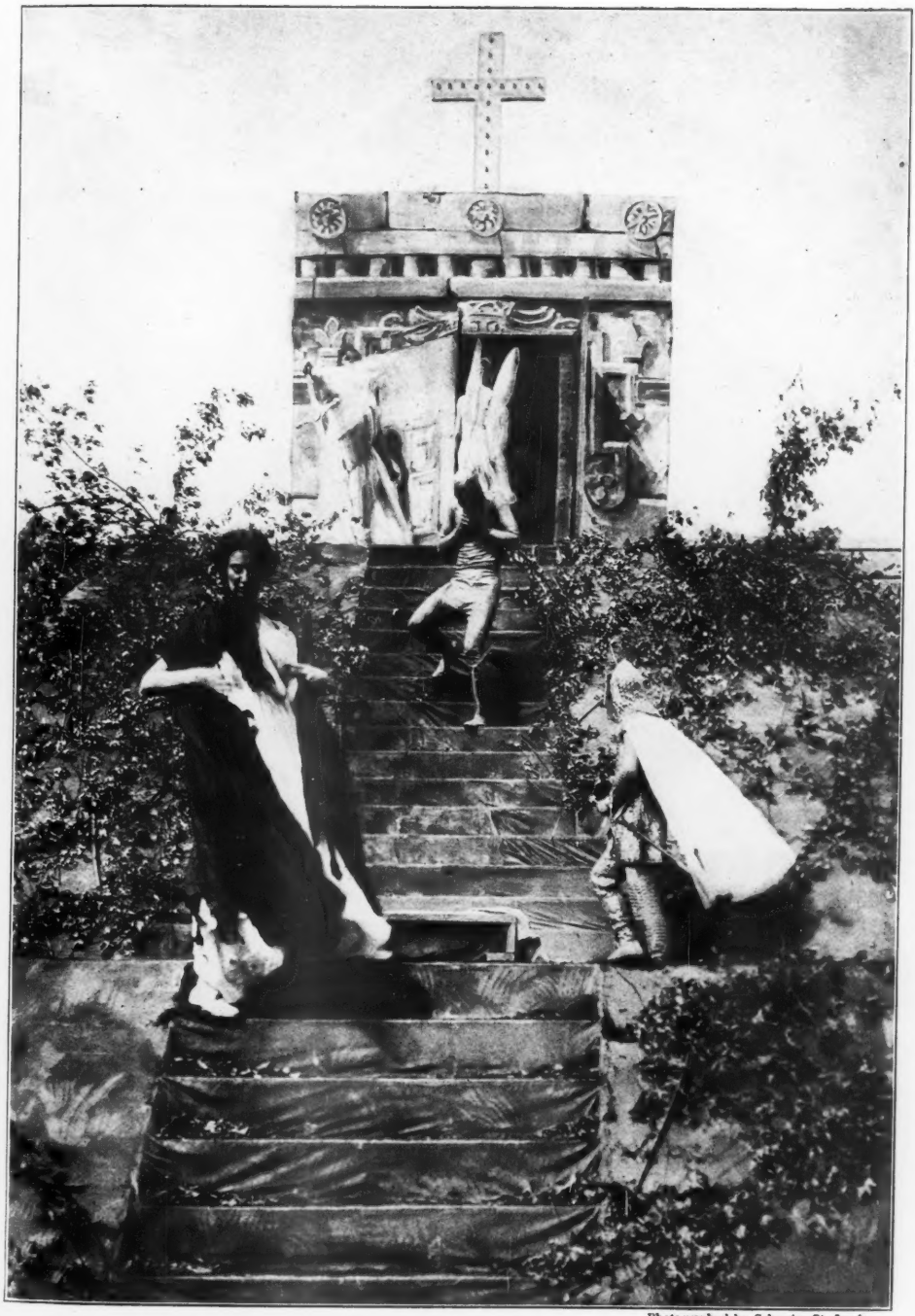
UPPER PICTURE: THE ARRIVAL OF CAPTAIN STODDARD AND MERIWETHER LEWIS ON "THE DAY OF THREE FLAGS." LOWER PICTURE: THE ARRIVAL OF MARQUETTE AND JOLIET AT THE SITE OF ST. LOUIS



Photographed by Schweig, St. Louis

PART OF THE CAST OF "THE MASQUE OF SAINT LOUIS"

WHICH WAS ENACTED BY SEVERAL THOUSAND CITIZENS ON THREE EVENINGS IN LAST MAY AND JUNE BEFORE IMMENSE AUDIENCES THAT CROWDED A HUGE OPEN AIR THEATRE BESIDE A LAGOON IN THE GROUNDS OF THE WORLD'S FAIR OF TEN YEARS AGO



Photographed by Schweig, St. Louis

"GOLD" DEPOSED BY "LOVE" AND "IMAGINATION"

A SCENE FROM MR. PERCY MACKAYE'S "MASQUE OF SAINT LOUIS"

WHICH WAS ENACTED BY SEVEN THOUSAND ON THREE EVENINGS IN LAST MAY AND JUNE BEFORE IMMENSE AUDIENCES THAT CROWDED A HUGE OPEN AIR THEATRE BESIDE A LAGOON IN THE GROUNDS OF THE WORLD'S FAIR OF TEN YEARS AGO

UPPER PICTURE: CAPTAIN DE VOLSAY RAISING THE FRENCH FLAG. LOWER PICTURE: CAPTAIN STODDARD AND GOVERNOR DELASSUS SIGNING THE DOCUMENTS THAT TRANSFERRED ST. LOUIS TO THE UNITED STATES

Photographs by Schwelg, St. Louis

MADE VIVID BY PAGEANTRY

UPPER PICTURE: GENERAL HARRISON LEAVING ST. LOUIS IN A WELLS-FARGO COACH. LOWER PICTURE: THE PEOPLE OF ST. LOUIS READING THE PROCLAMATION THAT "THE COUNTRY IS CEDED TO AMERICA"

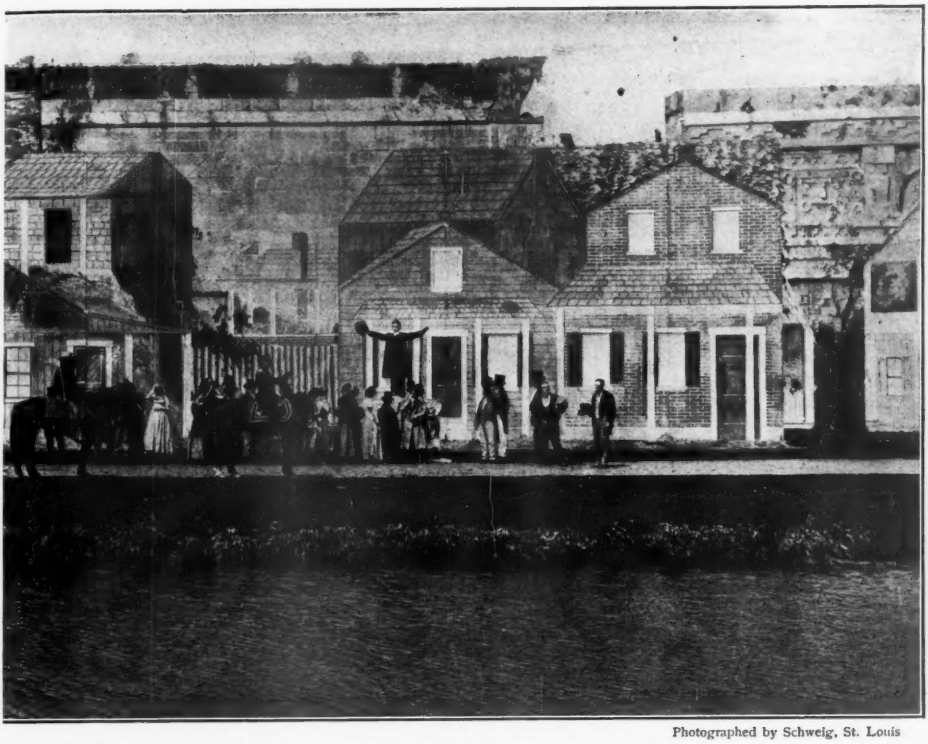
SENATOR THOMAS H. BENTON ADDRESSING COLONEL DONIPHAN AND BAT-

Mr. Smith worked in perfect collaboration. High up on the great back wall, in single file, like silhouettes, passed the figures of the first part of the Pageant, "a frieze symbolic of the passing years, the falling, faltering, onward-groping souls of human generations as they vaguely aspire from the dusk." As one great red figure paused at centre high up on this wall, and the other figures passed endlessly on and on, I recalled, and with something of the same thrill, that magnificent sweep across the stage in "Sumurun" of brilliantly colored figures, backed by the grayish blackness of the mosque at night.

Part II of the Masque opened with a fine Chorus of Pioneers. The allegory of this part busies itself with the struggle of Gold and his attendant Earth Spirits to conquer the soul of man and overcome Saint Louis. Mr. MacKaye develops his allegory, till the child, Love, breaks the force of Gold and restores his lost sword to Saint Louis. As Saint Louis addresses the representatives of the great cities who have come to greet him, one hears again the Chorus of the Stars:

> Out of the formless void
> Beauty and order are born:
> One for the all, all in one,
> We wheel in the joy of our dance.
>
> Brother with brother
> Sharing our light,
> Build we new worlds
> With ancient fire!

This is not the place for any detailed discussion of the technical problems raised by the St. Louis Pageant and Masque. It was perfectly clear that pageantry is more beautiful by night than by day. Not only did the Masque gain by the artificial lighting, but the Second Part of the Pageant itself, given by artificial light, was more beautiful to the eye than the First Part, acted in daylight. It is clear, too, that a city need not be daunted by the great expense involved in such a pageant. This one was expected to cost $125,000. A guarantee fund of only



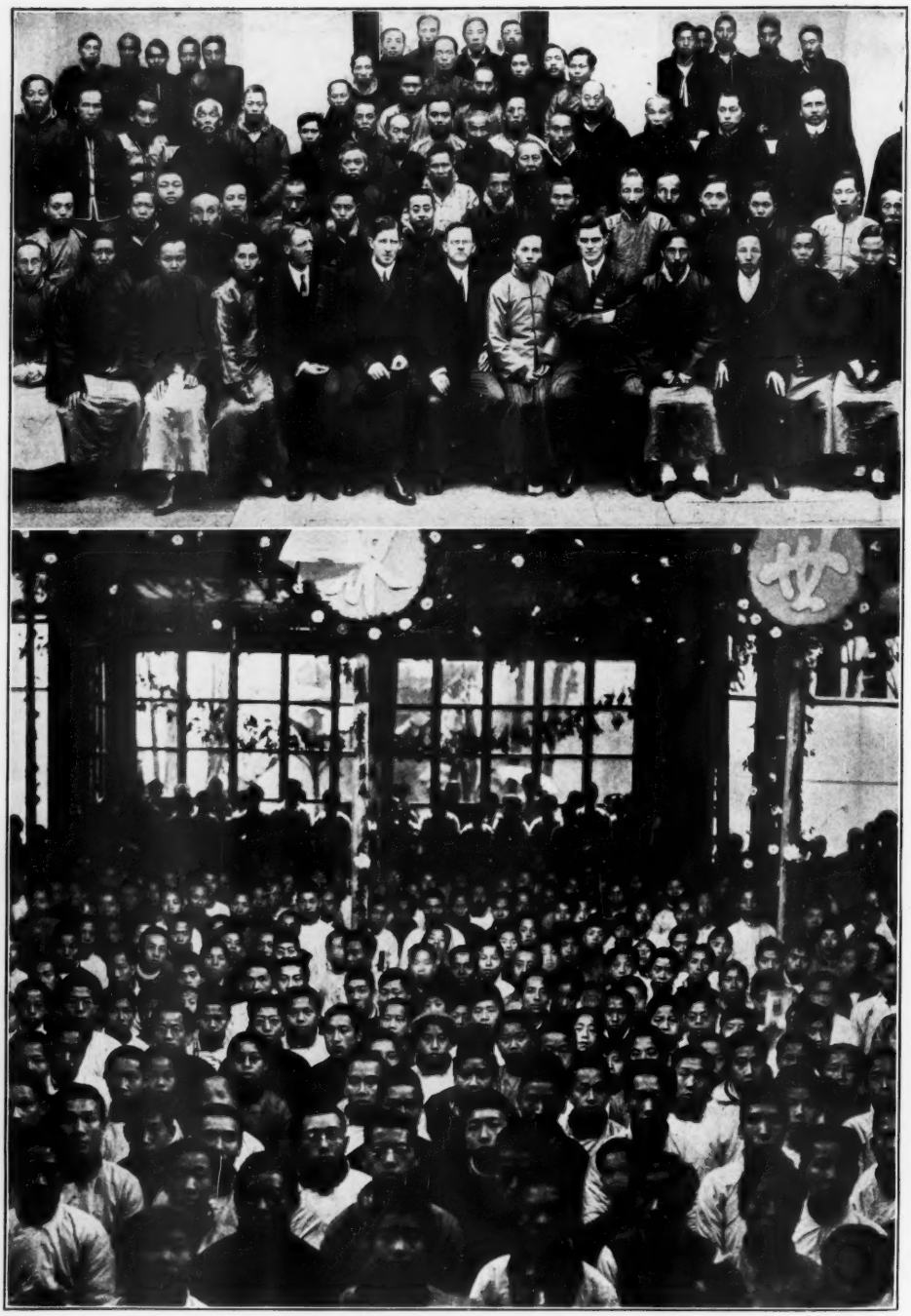
Photographed by Schweig, St. Louis

TERY "A" UPON THEIR RETURN FROM THEIR CAMPAIGN IN MEXICO

about $60,000 was raised, but the immense ticket sale will probably make up the difference between this and the required sum.

On the other hand it is a question whether both Pageant and Masque might not have gained had they been given on separate nights. With the entre-act, they made a programme that lasted more than three hours, and demanded a closeness of attention almost exhausting for so long a space. Two hours is, apparently, about all a public can stand in these open air productions. For the pageant master and the dramatist, both Masque and Pageant may raise many interesting questions as to the proper use of more or less intimate pantomime in such productions, and as to the amount the speaking voice should be depended upon for effect. Two or three members of the cast had strong voices of remarkable carrying power. A few had been trained to handle lighter voices with clearness, but many could be heard only at times. Emotional shading became impossible for nearly all concerned. Probably, from all over the country, persons with powerful voices capable of emotional shading even under conditions like these could be gathered, but it is one of the vital principles of pageantry to use to the utmost people of the community. How are these problems to be met in the future?

Yet, whatever questions of this kind may be raised, they are of purely secondary importance. The main point is that St. Louis has shown how a vast entertainment of the people by the people may be successfully given — successful financially, successful artistically. Creating in her people from many lands a common interest in her history, she has created in them, too, hunger for entertainment of similar high artistic quality. She has broken the way for her sister cities. All honor to those hard working committee members who, standing behind authors and directors, have helped them to give St. Louis this new claim on our attention and gratitude!



LEADERS OF THE NEW EAST

WHO WELCOMED THE YOUNG MEN'S CHRISTIAN ASSOCIATION TO CHINA. UPPER PICTURE: THE PROVINCIAL PARLIAMENT OF FUKIEN. LOWER PICTURE: CHINESE STUDENTS IN FOOCHOW

ASIA AWAKE AND ARISING

A MORAL REVOLUTION SWEEPING OVER CHINA JUST AS THE BREAKDOWN OF OLD FAITHS WAS THREATENING THE STABILITY OF THE PEOPLE'S CHARACTER — THE ASTONISHING GROWTH OF NATIONAL CONSCIOUSNESS AMONG RACES THAT UNTIL NOW HAD NO WORD TO EXPRESS THE IDEA OF PATRIOTISM — AN INTELLECTUAL RENAISSANCE AND AN ECONOMIC REVOLUTION

BY

SHERWOOD EDDY

(SECRETARY FOR ASIA OF THE INTERNATIONAL COMMITTEE OF THE YOUNG MEN'S CHRISTIAN ASSOCIATION)

DURING the last eighteen years, in my work for the Young Men's Christian Association among the students and official classes, my duties have taken me throughout Asia and compel me to visit yearly in Japan, China, and India. My last journey was in 1913, when, with Dr. John R. Mott, I crossed the continent of Asia. Upon our arrival in China, the first banquet given us in Shanghai showed the changes which had so recently taken place in that country. About two hundred of the leaders of this young republic, arrayed in evening dress, gathered in the Palace Hotel. In the chair was Mr. K. S. Wong, business manager of China's great iron and steel works, and perhaps the future Carnegie of China. In these works, that employ more than 4,000 workmen, we afterward saw skilled laborers turning out the finest steel rails with which to build

MR. SHERWOOD EDDY

WHO HAS INTRODUCED WESTERN EDUCATION INTO SOME OF THE REMOTEST PARTS OF CHINA

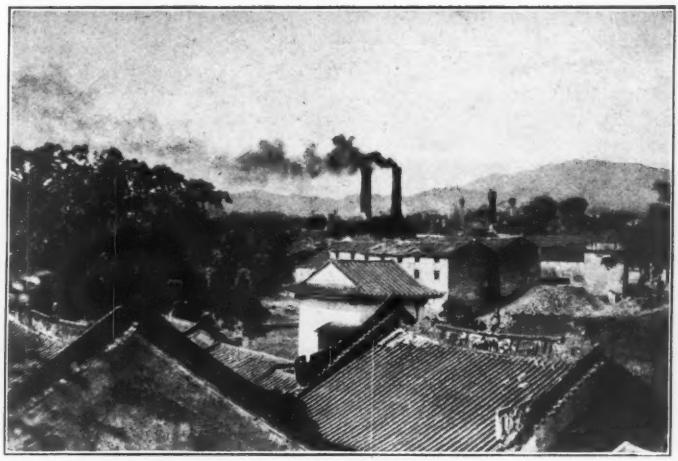
THE KAIPING MINES IN NORTHERN CHINA
THAT YIELD ABOUT 1½ MILLION TONS OF SOFT BITUMINOUS COAL YEARLY

the new railroads of China, that will stretch from Shanghai to Burma and from Canton in the south to Siberia in the north. On the left sat Dr. Wu Ting-fang, former minister in Washington, who represented the revolutionary forces in the negotiations with the Manchus in forming the new Republic of China. Next to him sat the manager of the Nanking Railroad, a graduate of Yale. All about us were the leaders of the new industries of China and the signs of an industrial awakening that is affecting almost all the countries of the Orient.

As I glanced over the leaders of the Young China Party assembled at this banquet in Shanghai to which I have referred, I saw evidence also of the great political awakening that is affecting China and the entire East. On either side of the room were draped the flags of America and China, the two sister republics of the Pacific. It was evident as I traveled throughout the new republic that America is everywhere regarded as China's best friend. This will be a most valuable asset to us in all

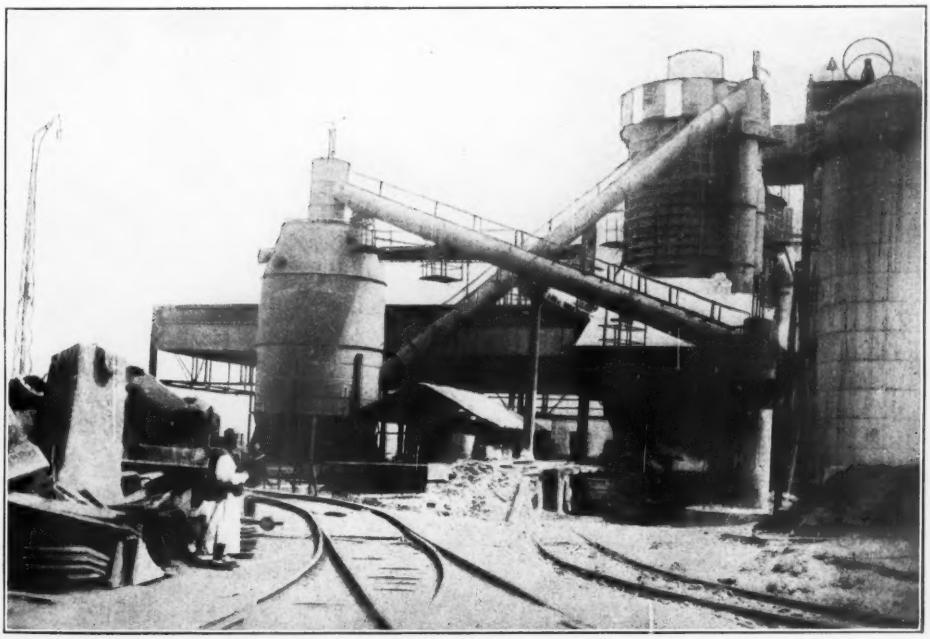
HANKOW, A CENTRE OF RAILROADS AND FACTORIES

our commercial and political relations with China in the future. In 1861 it was America's first representative, Anson Burlingame, who resisted the "spoils system." In 1899 John Hay fought for the "open door" against the "spheres of influence" of other Powers. In 1901 America resisted the partition of China after the Boxer Uprising and protested against the unjust indemnities levied by some of the other nations. Under President Roosevelt, America helped to confine the war between Russia and Japan to Manchuria, and to restore peace. It was America that returned much of the Boxer Indemnity money to educate Chinese students. But above all, America of all the great nations does not possess any of China's territory. It is to America, the peaceful trading nation of the Pacific, the model republic, from which China has patterned her own government, that China looks for her best friend.



MODERN INDUSTRIAL PLANTS IN CANTON
THAT SUGGEST THE NEW ERA OF MANUFACTURES THAT IS OPENING IN CHINA

Not China only, but the entire East has been quickened by the new political movement. There has been a develop-



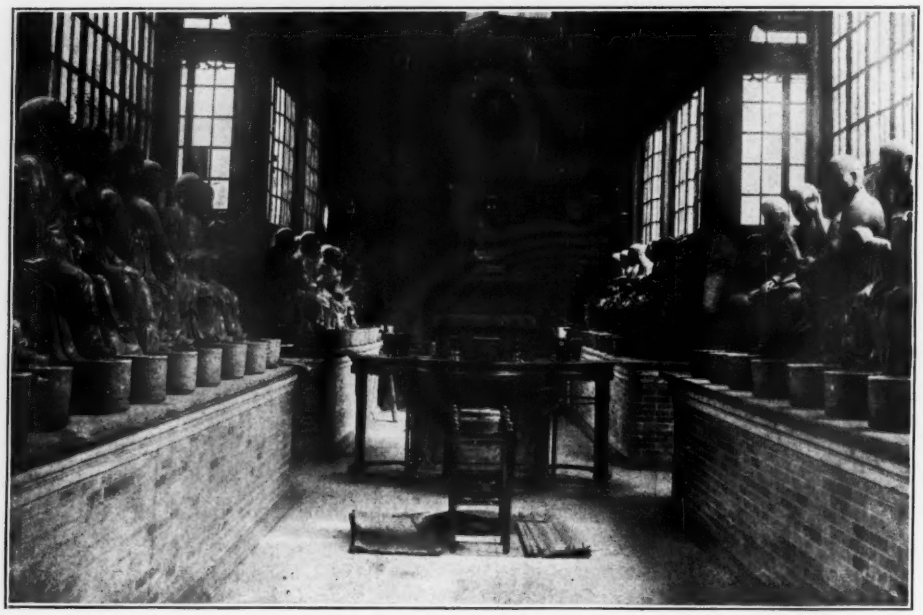
THE GREAT MODERN IRON WORKS AT HANYANG

ment of nationality, patriotism, constitutional government, and military power far exceeding the same development in Europe four centuries ago, both in its rapidity and extent.

Japan chiefly led the way in the opening of the Far East. Its victory over Russia in 1905 was really a victory for the entire Eastern world. Not merely to her own advantage did Japan thus gain recognized equality among the great Powers of the West. Within a month of the signing of the Treaty of Portsmouth one stroke of the vermilion pencil of the Chinese Emperor had abolished the obsolete system of the ancient régime, substituting the educational principles of the new era. The next year the Shah of Persia was compelled to grant a constitution to his people, and two years later the Young Turk Party brought on the revolution in Turkey. The news of Japan's victory flashed like an electric spark across Asia and sent a thrill of hope through the whole Eastern hemisphere.

An intense development of the spirit of nationalism and patriotism has swept through almost all the great peoples of Asia. This spirit has come to the East from the West. Not one of the great Oriental nations held this concept of patriotism, nor was there any word in most of the Eastern languages to express it, until these ideas came with the great principles of Western civilization.

To-day this burning patriotism is sweeping through the students and the younger generation of China and extending rapidly even among the masses. I heard in China of many a student who had cut off a finger that he might, in his own blood, sign a petition to the throne for liberty. It was a strange sight to see student audiences with their cues gone and with them all the conservatism of the last four thousand years suddenly cast away. Whole audiences rose with intense feeling to sing their new national anthem to the same tune as that of several of the great nations of the West. The widespread demand for a republic and the recent change of government were striking evidences of the new



"THE TEMPLE OF FIVE HUNDRED GODS"

ALL OVER CHINA TEMPLES LIKE THIS ARE BEING CONFISCATED FOR USE AS SCHOOLS, AND IN ONE CITY THE IDOLS WERE GROUND TO POWDER TO MAKE BRICKS WITH WHICH TO REPAIR A SCHOOL IN WHICH WESTERN EDUCATION IS GIVEN TO THE PEOPLE

spirit of nationalism and patriotism which has pervaded the Chinese people, and so strong is the demand for it to-day that, despite local disturbances, democratic and republican government can probably never be permanently overthrown in China.

Despite the serious problems that confront China to-day, I am convinced that the Republic of China has come to stay. China's sudden revolution was preceded by a long evolution of preparation. The strength of character of the Chinese people also makes for permanence. Every nation that began with China has fallen. Nineveh and Babylon, Assyria and Egypt, Greece and Rome have passed away, but China, after four thousand years of continuous history, seems to have renewed its youth. It is not decadent, like some of the races of Southern Europe, but strong and virile, with its greater future all before it. This great people showed its strength of character when 40,000 of them laid down their lives rather than renounce their faith in the Boxer Uprising. As a race, the Chinese are naturally democratic, being self-governing in the family, the clan, the trade-guild, the village, and the province. The Chinese people will never again long permit the rule of an autocracy superimposed upon their broad democracy.

A WOOLEN MILL IN SHANGHAI

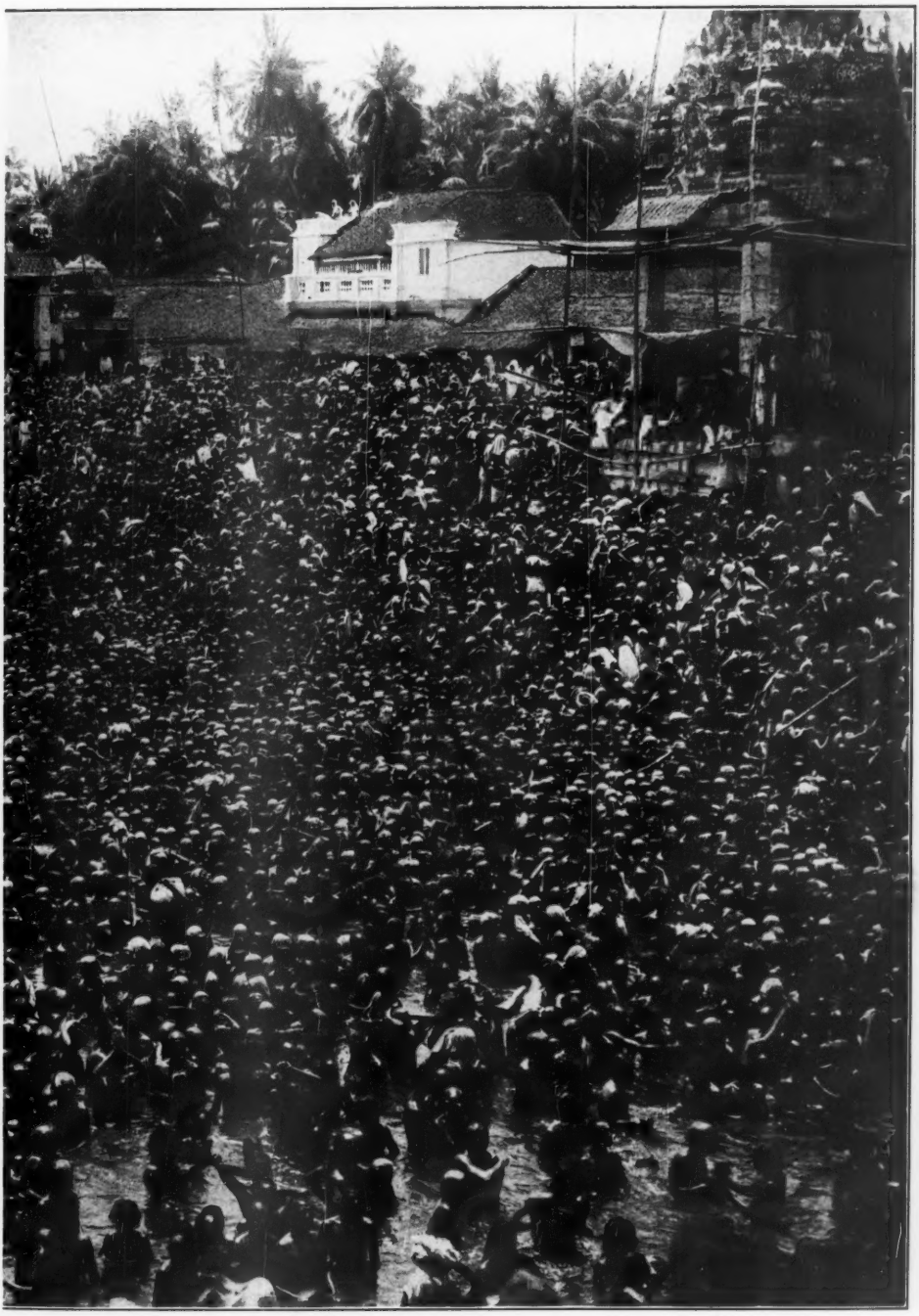
FOUR THOUSAND WOMEN AND GIRLS ARE EMPLOYED IN THIS GREAT FACTORY, WHICH IS ONE OF THE MANY EVIDENCES OF THE INDUSTRIAL AWAKENING OF CHINA

The same burning patriotism has spread among the students of India. Indeed, every student audience from Tokyo to Calcutta, from Shanghai to Constantinople, from Seoul to Bombay, showed the same deep national feeling, the same response to the national note.

The students of India to-day are not reading the Vedas or the musings of the ancient Rishis or speculative philosophy,

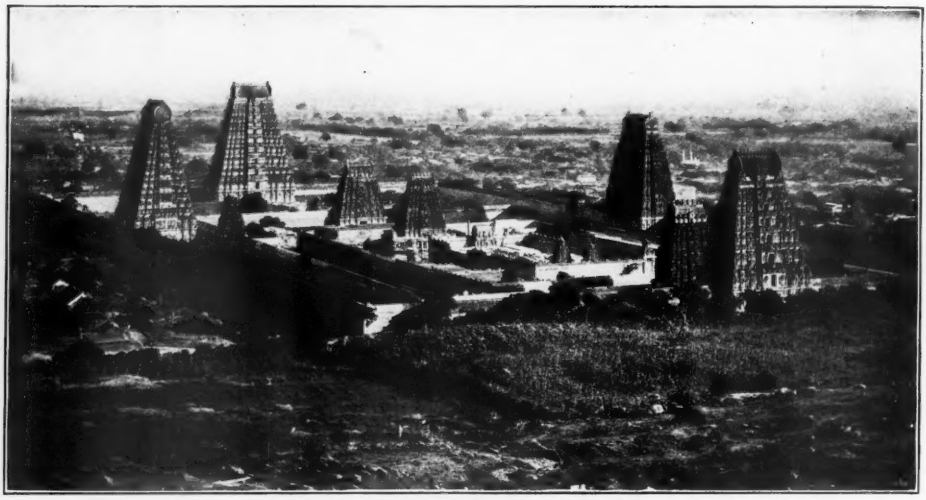
TEN THOUSAND HINDU WORSHIPPERS AT A

IN INDIA, AS THROUGHOUT ALL ASIA, THE OLD FAITHS ARE BEING AFFECTED BY CHRISTIANITY, OF FARMING AND TO



RELIGIOUS FESTIVAL IN SOUTHERN INDIA

AND THE PRIMITIVE AGRICULTURE AND HANDICRAFTS ARE YIELDING TO MODERN METHODS MODERN INDUSTRIALISM

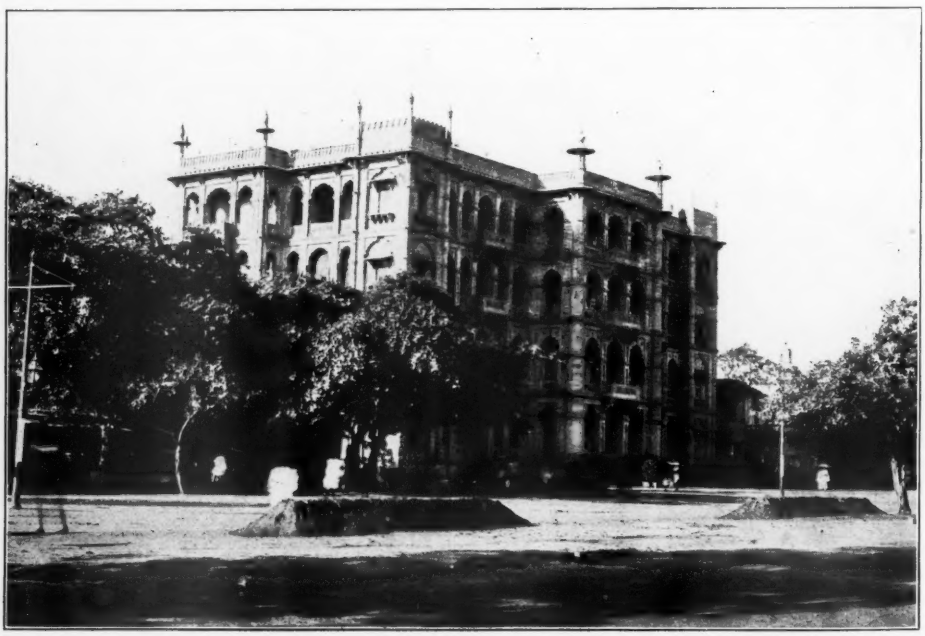


AN OLD HINDU TEMPLE IN INDIA

THE TOWERS ARE HUGE, INTRICATELY CARVED GATEWAYS TO THE INNER SHRINE

but they are reading Mill and Mazzini on liberty, they are interested in the American and French revolutions and in England's struggle for liberty. This developing of national consciousness, which is slowly but surely penetrating the masses, will probably in time bring India to the position of a great self-governing member of the British Empire, like Canada.

The intellectual awakening throughout the East is even more startling. In China, temples in many of the cities have been



A Y. M. C. A. BUILDING IN MADRAS

A CENTRE OF MODERN EDUCATIONAL, PHYSICAL, AND SPIRITUAL ADVANCE IN THE HEART OF SOUTHERN ASIA

confiscated to accommodate the colleges or schools which are being founded more rapidly than buildings can be built for them. The ancient examination halls of the classic system are being torn down to build the new universities and parliament buildings. The number of modern government students in Peking rose in ten years from three hundred to seventeen thousand, and the pupils in the surrounding province increased from two thousand to two hundred thousand. During a visit to a dozen of the cities in China I found from four thousand to twelve thousand students in each. The splendid buildings of the great normal schools rise in many cities, some having a thousand teachers in training, for China's new system when completed will call for nearly a million teachers. There is a thirst for modern education greater even than that which was formerly manifested for the old learning, when men of seventy or eighty years of age were seen still trying to pass the classic examinations. Even women's education is being rapidly advanced in China.

The printing press is extending this Oriental renaissance much more rapidly than it did the Occidental renaissance. Although the Chinese invented movable type five centuries before Gutenberg at Mainz, it was Robert Morrison, the missionary, who brought the first modern press to China. China's one permitted newspaper, the *Imperial Gazette*, for the government officers, is now multiplied two hundredfold. William Carey, "the cobbler missionary," introduced the printing press and newspaper into India, where to-day 3,500 newspapers and periodicals are issued from 2,700 presses.

A MORAL REVOLUTION, TOO

But the awakening of Asia has not been confined to the commercial, the political, and the intellectual life of the people. A moral and religious awakening is taking place as well. Nor is it the masses alone that are being affected by the present change. Even more striking is the new attitude of openness on the part of the officers and students toward the benefits of Christian civilization. The Young Men's Christian Association, among other agencies, is especially seeking to coöperate with the official and student classes in their search for a more enduring foundation for the new civilization. In the last inland province of China the governor recently offered a splendid site for a new Y. M. C. A. building to help the students of his province. Members of parliament and Confucian business men are contributing $50,000 toward the erection of this new building.

Why do they do this? It is hard for us to realize how much such an institution means to such a province in China. Imagine a crowded city of a million people, with narrow and insanitary streets, without a park, a playground, a library, a hospital, or a clean place of resort, but infested with opium dens and centres of gambling and vice. Then place in the heart of that city a great Y. M. C. A. building, with all its humanitarian and philanthropic activities; it becomes to them the very epitome of Western civilization at its best. Here are the indoor gymnastics, training Chinese athletic directors for an empire; its out-door athletics, with football, baseball, and the track, its Olympic games for the Far East, with China, Japan, and the Philippines competing; its fight for sanitation; the Anti-Tuberculosis League, and the Playground Movement — all these are a physical gospel for a nation that deeply needs it. Its educational classes are crowded both in the day and night schools with students from the leading families, eagerly seeking a Western education. Its science department and lectureships are reaching the officers and government students of every provincial capital. Its social activities are uniting all classes in a broadening circle of brotherhood. Its moral uplift comes to China just at the time of the rapid and ominous breakdown of the old religions in their patent inability to satisfy the individual or to supply a sufficient basis for moral and religious life. Its trade-schools are introducing new machinery, Western inventions, modern commercial methods, and are aiding the economic uplift of provinces that are rich in resources but that are suffering from deep poverty because of the ignorance

and superstition that were created and permitted by the old régime.

AMERICAN IDEALS, AMERICAN GOODS

For every dollar thus invested in philanthropy or missions in China a hundred dollars will come back in trade to this country. Although this is not the motive of our work, the fact is nevertheless indisputable. Twelve hundred Chinese students who are studying to-day in America are going back as the future governors, officers, engineers, and leaders of every department of that great Republic. Where will these men procure their machinery and their supplies? In answer, let me record that I traveled over a railroad in the East, where I was drawn by Philadelphia locomotives, in cars made in Wilmington, Del., over Pittsburg rails, nailed with New York spikes to Oregon ties. In the dining car I ate Chicago beef and Pittsburg pickles; I saw many houses of the better class that were lighted by American oil, or equipped with American sewing machines. The broad fields of Manchuria are being reaped by American harvesters, and the opportunities for big business in the East are enormous.

The breakdown of the old religions, and their inability to supply a sufficient basis for morality, are leading, for a time, especially in Japan and China, to secularization and materialism. The danger is that this breakdown of the old religions may be so rapid that Christianity will not have time to take the place of the old, and to give a new and surer foundation for the life of the people.

A NEW WELCOME TO CHRISTIANITY

But with this tendency toward secularization there is a new religious attitude observable among the students. During the recent tour of Dr. John R. Mott and myself, this new attitude toward religion was unmistakably evident in the hearing that was given to the Christian message. Student audiences averaged about eight hundred a night in Japan, one thousand a night during the two months spent in India, and more than two thousand a night in China, where the interest became so intense that in the last two cities we visited — Mukden in the North and Foochow in the South — the audience rose to five thousand a day. More than fifty thousand different men in China, chiefly government students, attended these meetings. The meetings often lasted from two to three hours and in many cases people had to be turned away for lack of standing room in the largest halls or theatres that could be obtained.

Perhaps a concrete instance of the change which has taken place in a single typical city will serve to show the significance of the present religious awakening. Picture yourself entering an old Chinese city, the city of Foochow. Here we were heard by five thousand people a day, admitted by ticket only, and the total attendance during the six days rose to more than thirty thousand. Professor Robertson, the Y. M. C. A. expert in science, worked with me throughout the week. The leaders of the native Chamber of Commerce attended one lecture and a banquet. The members of seventy-two new reform societies of the city, which have sprung into being with the new spirit for reformation, attended one of the meetings. The Provincial Parliament itself adjourned and invited Mr. Robertson and myself to address them. It was an imposing body of men, and I have seldom spoken to a more enthusiastic audience anywhere.

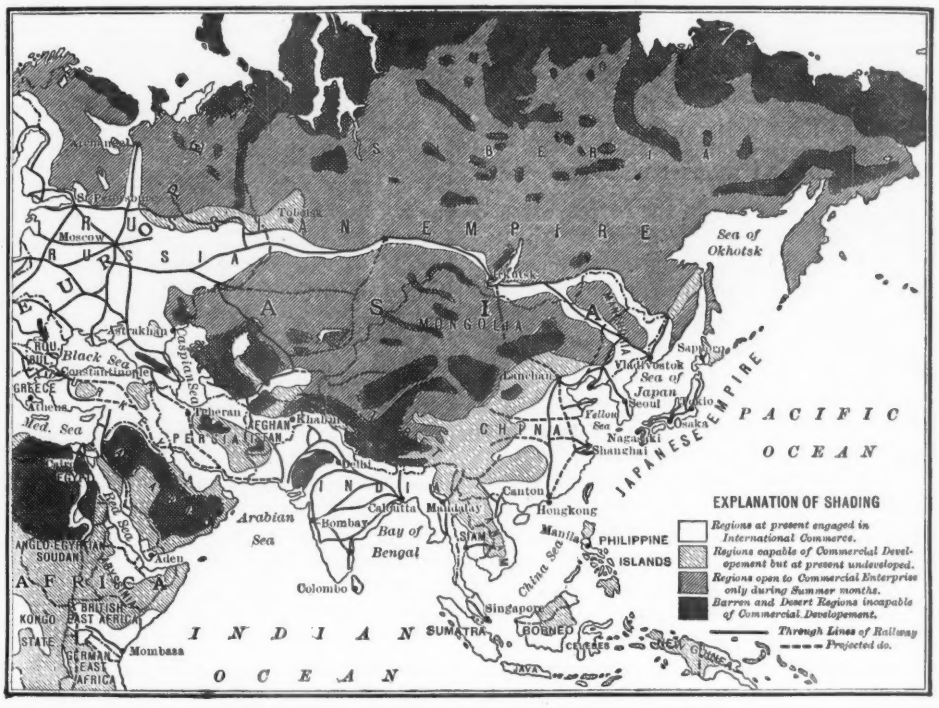
The Confucian presidents of thirteen governmental colleges and the commissioner of education in Foochow, who had officially invited us to visit the city, closed their colleges during the afternoons, that the students might attend our meetings, postponed the governmental examinations for a week, and invited Professor Robertson and myself to discuss plans for helping the students in their moral habits.

TAXICABS IN PEKING

In Peking under the old era, according to Sir Robert Hart, men were sometimes drowned during the rainy season in the deep pools of mud and water in the main streets of the city. Now we were speeding from college to college in a taxicab, in order to keep our lecturing engagements in the governmental colleges. Though we

had to slow up occasionally for a camel-train or plodding donkey-cart, as reminders that the old era was still obstructing the advance of the new, it was nevertheless evident that the new had the right of way, and had come to stay.

The Government threw open to us for the first time all the colleges of the city, and arranged our meetings for us. Taking



"CIVILIZATION FOLLOWS THE RAILROAD"

THE OUTPOSTS OF MODERN COMMERCE PUSHING INLAND IN ASIA AND OPENING THE WAY TO THE RAPID EXTENSION OF THE WESTERN EDUCATIONAL AND POLITICAL IDEALS THAT HAVE ALREADY SET CHINA, IN PARTICULAR, ASTIR WITH NEW LIFE

five meetings a day we were able to visit the Imperial University, the great Law School, with its four hundred enthusiastic students, and some important colleges never before opened to Christians. The Tsing Hwa College, built by America's returned indemnity money, stands in the palace grounds that were reeking with the blood of the Christians in the Boxer Uprising. To-day, under a Chinese Christian principal and fifteen American Christian professors, this college is training all the government students who are to study in America and the West, and who will be the leading officers in the new China. The students, drawn from the eighteen provinces, are a strong body of men. Their studies are conducted in English, and, indeed, they could not understand each other in any other spoken language, as their provincial dialects are often unintelligible to one another. In 1910, before the revolution, China had organized 42,444 schools in the provinces, enrolling 1,284,965 students and pupils, but it will take some time to reorganize their educational department and adequately to finance it after the disorder of public affairs caused by the revolution.

In almost every province the officers are showing extraordinary favor to the work of the Young Men's Christian Association and to the representatives of Christian civilization. President Yuan Shih-kai himself has been generously supporting one of the secretaries of this movement. On two succeeding days I

interviewed the two generals who had commanded the opposing Northern and Southern armies in the recent revolution. Both are now governors, and both spoke enthusiastically of the Christian work for young men going on in their cities. Each of them asked that it should be extended to help the young men of the province. General Li Yuan-hung, Vice-President of the Republic, who commanded the Southern army, was particularly cordial. He gave us a European luncheon, and discussed with us the moral conditions of the young men of his province. Both these governors are liberal supporters of the work.

POWDERED IDOLS FOR BRICK

The two governors in the extreme western provinces on the borders of Burma and Tibet have shown the same remarkable spirit of cordial coöperation. In one of these provinces, which seemed the last stronghold to yield to foreign effort, the new era was introduced by two Chinese students who had just returned from Japan. Upon their return they told the governor that a political revolution was not enough. It was necessary, they said, to change the hearts of the people. They urged him to lend his assistance in founding a Young Men's Christian Association. The governor granted them a large Buddhist temple for the use of the new Association. The students ground the idols to powder, and used them to make bricks for repairing the building. The missionaries were called in to address the crowds that daily came to listen to the Christian message. It was, perhaps, the hardest city and province to influence in the whole of China, and yet in a day all was changed. Favorable edicts were issued throughout the city and province concerning the work. Non-Christian Confucian leaders began to demand the formation of Christian Associations in other cities of the province, and the work is still spreading.

Having observed the changed attitude of the officers and leaders of China, let me describe the transformation in individual character wrought by Christianity:

There is C. T. Wang, of Yale, who has had a brilliant career in the young Republic. He graduated from Yale with high honors, and as secretary of the Chinese Student Movement in America was the recognized leader of the hundreds of Chinese students in this country. Upon his return to China he again entered the service of the Young Men's Christian Association as a national secretary. Then came the revolution. Without risking his life his own position would have been assured. He had only to wait till the revolution blew over and he could have received a high office from either party that was successful, but he said: "I must go to the front. This is the hour of my country's need. The revolution may fail, or it may succeed. If it fails I could never forget that in the hour of the nation's need, at the crisis of her fate, I did not put my life upon the altar. Should it succeed I would then have waited until there was no longer any risk, and I would have had no part in China's fight for freedom. No, I must join the movement when there is a chance to die." And he started for the front.

A CHRISTIAN IN YUAN SHIH-KAI'S CABINET

He was soon made a member of General Li's staff, and acted as Minister of Foreign Affairs under him in the provisional government. The Vice-President, then General Li Yuan-hung, sent him to be one of the representatives of the revolutionary forces in the negotiations for peace. When Dr. Sun Yat-sen became the Provisional President of the Republic, Mr. Wang became his personal representative in important negotiations. Elected a member of the National Senate, he was a power for peace and unity in reconciling the contending forces of the North and South in seeking to hold China together. Soon he was called to be Acting Minister of Commerce in Yuan Shih-kai's Cabinet.

When he was elected Vice-President of the new Senate in Peking, with about sixty other Christians in that national body, he was laboring with high purpose and splendid self-denial as a burning patriot for the welfare of China. Perhaps more than any other man in China he is playing the part that Alexander Hamilton played in the constructive period after the American Revolution.

Think of the significance of this mighty movement which is sweeping Asia to-day — Asia, the cradle of the race, the birthplace of civilization, the teacher of the West, the mother of all the great religions of the world, is awakening, Asia, with its more than nine hundred millions, or more than half the human race!

THE ECONOMIC REGENERATION OF ASIA

The economic awakening of Asia is equally unmistakable. During the latter half of the nineteenth century the trade of India increased fourfold and that of China sixfold. The trade of Japan has increased sevenfold in twenty years. But the twentieth century will see far greater developments in the East than the nineteenth. The simple age of agriculture is giving way to an age of industry, handicrafts to national commerce, and isolation to the new means of communication that are producing a new national and international consciousness. Based on the new sense of nationality in the renaissance of Europe, the free thought which led to the development of trade in England, France, and Holland is producing the same economic development in Japan, China, and India to-day. The chimneys of the great factories of Osaka and Calcutta tower like those of Birmingham. A decade or two ago scavengers were picking up old horseshoes in the streets of London and shipping them out to make third-rate plows for the farmers on the hills of Central China. To-day, digging under those hills in the four central provinces, they find what may prove to be the greatest coal fields in the world — enough in the Shansi province alone to supply the world for more than a thousand years, according to the estimates of the German geologist, Baron von Richthofen. In Central China they have found iron ore better for casting than that used to-day in Pittsburg. The great Hanyang Iron and Steel Works at Wuchang, across from Hankow — the Chicago of China — employs four thousand workmen, and is turning out steel rails of the highest quality for the new railroads of China. If China's manufactures were developed as efficiently as those of America, the gross returns would equal the entire national debt ($877,000,000) in three weeks. Though retarded for a short time by the adjustment of her political difficulties, it will surely, though not slowly, develop these vast resources.

The economic development of India, though somewhat retarded, is equally unmistakable. Its trade has increased during the last half century from $300,000,000 to more than $1,400,000,000. It has in operation 32,000 miles of railroad, which places India fourth in the world in its railroad mileage, carrying 330,000,000 passengers yearly at the rate of five miles for one cent. It maintains 76,000 miles of telegraph line, over which messages can be sent for more than 2,000 miles at a cost of only twelve cents.

INDIA'S ECONOMIC GROWTH

India is now the largest exporter of rice in the world, holds first place in its exports of tea, next to Argentina is the largest exporter of hides, and next to the United States is the largest exporter of cotton in the world. Next to the United States and Russia it is the largest wheat-producing country. The Tata Iron Works in Bengal, employing 8,000 men, have laid down iron in San Francisco at less than the price charged by the United States Steel Corporation.

India's system of irrigation stands easily first in the world, being far more extensive than that of Egypt or America. Its more than 46,000 miles of irrigation canals have reclaimed more than 22,000,000 acres of land, and famine has been prevented forever in some districts.

The same principles that created our Western civilization are at work to-day in the ancient East, bringing about the same great transformations there that they have wrought in the West. So vast and widespread is this awakening that it might well be called "The Renaissance of Asia." And yet it is more than this; it is an intellectual renaissance, a religious reformation, and a nineteenth century of scientific and industrial development all combined. It is even greater in volume and in power than the Renaissance of Europe five centuries ago.

REDRAWING THE RAILROAD MAP OF THE WORLD

A ROMANCE OF MIGHTY ENDEAVOR IN BUILDING GREAT SYSTEMS ACROSS ITS OPEN SPACES — THE PART THAT RAILROADS ARE PLAYING IN THE STRUGGLE FOR THE SUPREMACY OF NATIONS — SOUTH AMERICA THE SCENE OF THE NEXT BIG EPOCH OF EXPANSION

BY

C. M. KEYS

THERE are no more railroad worlds to conquer within the frontiers of the United States. The age of the great American railroad kings, whose dynasties were the envy and the wonder of the world of transportation, is past. Now we engage in the harder task of undoing the things that have been done, of limiting railroad power, of stripping away the great authority that made the railroad magnates, in their day, potentates alike in the world of transportation, the world of commerce, and even the world of politics.

Where, then, are the Huntingtons, the Hills, and the Harrimans of to-morrow to find the work that they must do? It is an impossible thought that genius such as theirs shall be wasted for lack of space and problems upon which to work. Transportation is still too young and the earth is still too big to believe that the things that have been done in this great world of hard endeavor in the last three generations is a work completed forever. Other railroad empires, perhaps greater than any of the past, must rise, and fall again. Other men, as great as Hill and Harriman, must find as great a destiny as these, and pass and fall, maybe. But where, and how, and when?

There is an old Erie Railroad man building a bit of a railroad down in the Andes who has the thing in his heart that makes the transportation world go round. The road is no Pennsylvania System. It is, to be exact, 160 miles long. The rails weigh only 55 pounds to the yard. The gauge is only 42 inches. When he gets it built he will burn, for fuel, wood out of the forests. What the traffic will be remains to be seen. You start out of Guayaquil, in the flat lands of Ecuador, go creeping through swamps, climb up to the peak of the Andes, and career along madly on the same peak until you come to a village called Ambato. That is where the new road starts. It runs east into the wilderness, known locally as the Oriente. It climbs along the mountain sides, steals through lofty passes, climbs hills and dips into valleys until, at last, it will, some day, come out at a village called San Antonio, down on the eastern slope of the Andes. At San Antonio the waters run eastward. That is the story.

On the whole, judging from the descriptions that are available, the railroad is one of those joke railroads such as one may find, by careful looking, in the hilly parts of New Jersey, Colorado, Alabama, and many other states. Yet, at the end of a brief and rather matter-of-fact description of it, Mr. Charles H. Moore, the Yankee engineer in charge, has this to say:

"With the opening up of this great district of the east, and the placing of the Atlantic and Pacific oceans into communication through a comparatively low-grade railroad, a tremendous development may be looked for."

It takes the seeing eye and the understanding heart of one who has held converse in the good old days with the men who pierced our prairies and conquered our mountain ranges to detect in that simple phrase the true inwardness of its meaning. From San Antonio, Ecuador, to the

Atlantic Ocean is almost as far as from Harrisburg, Pa., to the Pacific. So might the man who labored, nearly a hundred years ago, to shove rails from tidewater to Harrisburg have seen in his little task the beginning of the great American transcontinentals of to-day. Mr. Moore and his little staff of railroad men that are building the Rio Curaray Railroad have in them, perhaps, the stuff that made a Huntington.

Let us look at the great dreams of all the world's railroad history and see, if may be, what remains that has not yet come true. Oddly enough, there is no romance in local railroads. A man may build ten thousand miles of railroad running hither and yon all over a country that needs them, and all his labor does not fascinate half so much as the little task of shoving through a thousand miles of road across some vacant gap to make a new main line. There, and there alone, lies the stuff that great railroad dreams are made of.

A generation ago, there was no railroad from New York to the Pacific Ocean. Now there are half a dozen. There was no route from Montreal to the Pacific. Now there are nearly two and a half. The Panama Railroad was the first North American transcontinental. The Grand Trunk Pacific looks like the last. Here, one may say, ends the romance of railroad transportation in North America. Every one of these great roads was a task for a giant. Nearly every one produced the giant. Perhaps the age of giants is over in North America. Huntington, Hill, Strathcona, Van Horne — they may be the end of the roster.

Once, years and years ago, men built little railroads out from Calcutta and from Bombay. Then, in the course of time, they pushed them through and joined them, and India was bridged. It was a great romance. Since then they have gridironed old India with railroads, some of them more useful and more profitable, and nobody cares very much. There was, apparently, room for only one railroad romance in India. Nowadays the railroad business in that queer country is only business. They carry passengers for one third of a cent a mile, and they never kill anybody. Any railroad man knows there is no romance in that.

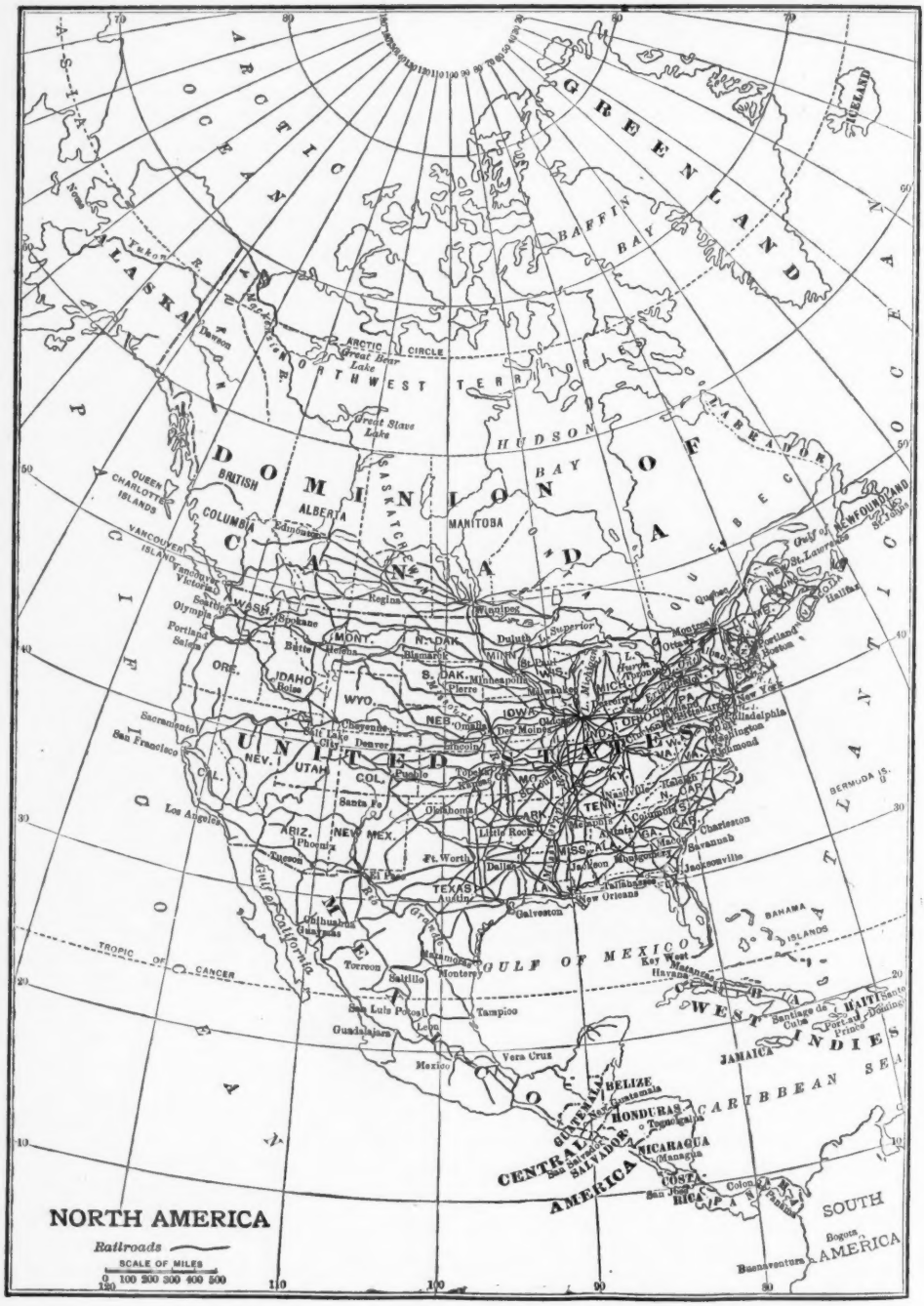
There is a railroad from the North Sea to the Japan Sea. It was built by a nation to capture nations. It has failed of its purpose so far. The Trans-Siberian, all things considered, is the most gigantic railroad task that ever was performed. In money, it will eat up more than $1,000,000,000. In lives, it has destroyed thousands. Its earnings are practically negligible. Yet, at this time, the Russians are laying double tracks on it from end to end! Moreover, they are building one branch of it that would reach from New York to Chicago and leave three hundred miles for sidings, and that will cost more than $150,000,000.

A RAILROAD BUILT TO CAPTURE NATIONS

If that were only a railroad, it would be the greatest railroad mystery of the ages; but it is not only a railroad. It is like the army and the navy of Russia. It is a national expenditure for the conquest of Asia. Some day, no doubt, when the coffers of Russia are filled again with gold, the rest of the story of the Trans-Siberian will be written. Now it is only being dreamed. Probably the men who are doing the dreaming will not live to see the writing.

In Asia there is another project that for a generation has fascinated men. It is the project of a link to tie the railroads of Europe to the railroads of India, so that the Englishman may reach his prized possessions of the Orient without taking so much time about it. Of course, there are other reasons, but that seems to be the main one. Because of political complications, mainly the conviction that Russia would some day certainly grab any railroad that ran toward India and use it for her own purpose, that railroad dream languished. Now it comes true. About 2,000 miles of railroad are to be built, to cost about $200,000,000. No one estimates that it will ever earn its keep. That is one of the mysteries of the way they do things in Asia. Money seems no object. It is the public's money, anyway, so who cares!

There is another railroad project within the boundaries of Asia that is big enough



THE GREATEST RAILROAD EMPIRE AND THE

THE UNITED STATES AND CANADA ARE NOW SUPPLIED WITH ADEQUATE TRANSCONTINENTAL
NEW CONSTRUCTION AND IS

NEXT GREAT FIELD OF CONSTRUCTION

AND LOCAL TRANSPORTATION LINES. SOUTH AMERICA, AND ESPECIALLY BRAZIL, NEEDS MUCH PREPARING TO CREATE IT

to hold the fancy of any man, no matter how ambitious or how daring he may be. It has hardly, however, assumed a definite enough form to be considered at the present time even a project. Some day in the distant future, no doubt, it will be built and men will travel on it. Down from the Black Sea to the oil fields on the western shore of the Caspian Sea, two railroads run. They are, of course, Russian railroads. From the eastern shore of the Caspian Sea, another little railroad runs away to the east, through Turkestan, with a branch to the border of Afghanistan. From the eastern terminus of this little railroad there is a gap of several thousand miles across most of Turkestan and the Chinese Empire, in which there is not a mile of railroad either east, west, north, or south. In area, that region is greater than the United States. In population it far outweighs this country. Some day, no doubt, a great trunk line will be built through it as part of the new Chinese and Russian system of Asiatic roads.

AN EMPIRE WITHOUT A RAILROAD

That is, however, too big a project for any individual in the world to grasp. What is more, it seems to be a settled fact that, on account of the mixed political relationships and the strong international jealousy of European and Asiatic countries, there is no room for private enterprise to seize the great opportunities for railroad exploitation and development with lines in these unoccupied spaces of Asia. When the trans-Asiatic trunk line of the South is able to compete with the Trans-Siberian between the markets of Europe and the markets of China and the rest of the Orient, it will undoubtedly be built under governmental auspices. It remains for the future to tell whether the men that plan it and build it are subjects of the Czar, subjects of Germany, or of Great Britain, or citizens of the Chinese Republic or Empire. That task, splendid and fascinating as it is, seems to be set altogether outside the field of individual ambition and endeavor.

In Africa, one gigantic project is more or less under way and a dozen other projects appear to be definite enough to consider them possibilities of the future. The greatest of all African dreams is the Cape to Cairo Railroad.

THE CAPE TO CAIRO PROJECT

A few years ago this magnificent dream was little more than a prospect. It is still very far from completion and nobody knows how many years will pass before one may take a train from the Mediterranean to Cape Town, but the work seems to go on steadily but slowly, as the white man gradually conquers the diseases that bar his progress in the tropics. Already the rails reach far down toward the head waters of the Nile. Already from the south the trains run up across the Transvaal, across Rhodesia, and into the southern corner of the Belgian Congo. Approximately one may say that the rails from the south have covered one third the distance from Cape Town to Cairo and the rails from the north another third, leaving a great gap of about 1,700 miles between the Egyptian Sudan and British South Africa in which the whistle of the locomotive has never yet been heard. Literally that is hardly true, for rails stretch up from the eastern coast of German East Africa and British Africa well in toward the heart of the continent. The German line is to meet the Cape to Cairo line west of Lake Taganyika and the British line, no doubt in the course of years, will meet the long through route west of Lake Victoria Nyanza.

A RAILROAD ACROSS THE SAHARA

Up in Algeria, running down from the coast through Biskra to a little village called Tuggurt, is a French Government line with a name and intentions that suggest something wonderful. It is called the Trans-Sahara Railway. At the present time it is a little narrow-gauge road only 135 miles long. It is planned to cross the great Sahara Desert and to reach ultimately Lake Chad on the northern border of Nigeria. The distance is 1,400 miles and the country through which the road would run apparently offers nothing to induce railroad building. On the face of it, it looks like an official railroad dream rather than like a real project; but in those countries where governments build

railroads, they seem to be built sometimes without the slightest regard to traffic possibilities or money-making possibilities.

It can be said of Africa as of Asia that here there seems little, if any, opportunity for the kind of railroad enterprise that created the great railroad men in the United States. There seems, in fact, to be mighty little democracy of capital on either of those continents. The railroad business appears to be set aside as something reserved and segregated for the activities of governmental capital, of political power, and of official authority. It is hard to find in the whole of Africa a single project that looks in any sense like a counterpart of our Great Northern Railway, our Union Pacific, our Pennsylvania, our Illinois Central. Even the close partnership that exists between the Canadian Government and the great railroads of Canada seems to leave far more to individual initiative and courage than does the railroad building plan under which the railroads of Africa are being constructed. In no great instance, either in Africa or Asia, is a little group of private capital going ahead without governmental assistance, governmental subsidy, or governmental authority, to open the waste lands of the continent to commerce or to establish in waste places new centres of commercial life and industry. The kind of pioneering spirit that put such men as Huntington and Hill to the front of the crowd in American commercial development seems largely, if not wholly, lacking in the development of these other continents.

AUSTRALIA'S TRANSCONTINENTAL LINE

In Australia there is almost the same story to tell. The railroads of that continent, of course, began in little coast lines running here and there through the fertile belt. The great interior of Australia remains unopened by railroads. A few small lines run down from the north and up from the east and in from the west, reaching a few hundred miles toward the interior. The first transcontinental railroad is just now being built across that continent, north and south, but here, too, the task is in the hands of the Government. There is little, if any, incentive to gigantic individual endeavor in the railroad field in Australia.

If there is one section of the world in which the conditions surrounding the railroad business are anywhere near akin to the conditions that created the great American railroad systems, it is probable that that section is South America. One who has studied the commercial record of the Argentine Republic, or of Brazil, for the last twenty years, cannot help being struck by the similarity of development in many of its phases to the great period of exploitation which created the commerce of the United States as it stands to-day. The foundation of the two countries is the same, namely, an abundance of agricultural resources easily acceptable in the markets of the world if proper means for transportation are provided.

THE ARGENTINE A NEW UNITED STATES

In the Argentine Republic in particular there are many indications that not only has progress in transportation proceeded along the same lines that we followed in making the American railroads, but also that there remain in that country to-day opportunities somewhat similar to, if on a somewhat smaller scale than, the opportunities that lured men onward to build such systems as the Southern Pacific, Union Pacific, Santa Fé, or even our Eastern trunk lines.

A student of railroads, noting the growth of such roads as the Buenos Ayres & Pacific or the Buenos Ayres Great Southern, finds the development, the history, and the present mode of operation of these roads somewhat similar in a broad way to the development and operation of the Canadian Pacific. Even the tonnage which they carry, the rate at which they have grown, and the habit which they have of establishing a great many collateral industries connected with the railroad business are very much like the characteristics of the Canadian Pacific. Of course, none of them is on such a gigantic scale as the big Canadian trunk line. The Buenos Ayres Great Southern, which is the biggest railroad in the Argentine, had about 2,400 miles of track in 1903 and earned about $14,000,000 gross. In 1913 the mileage

was about 3,500 and the earnings about $33,000,000. The Canadian Pacific is about three times as big in both respects. Leaving mere size out of the question, the parallel is interesting. Both roads are trunk lines in agricultural belts, reaching practically all the important points in the territory which they serve. In fact, both roads have been very largely instrumental in building up and creating the traffic of the cities upon which they now exist and grow wealthy.

The Argentine road is almost entirely double track and the coast country and coast terminals have four or five tracks. Both are high grade railroads physically, using rail of great weight, the metal on the Argentine line being the heavier. The standard section on this South American road is 85 to 100 pounds to the yard, which is well up to the highest standard of American track. However, the gauge is 5 feet 6 inches against our standard gauge of 4 feet 8½ inches, so that in proportion to the weight to be carried the rail is probably not much, if any, stiffer than the rails on the Canadian Pacific. The tonnage of the Argentine road consists mostly of live-stock, wheat, and general goods. In this respect there is one important difference, which is that one of the heaviest items of the Canadian Pacific tonnage is lumber. The two roads are alike in that both live upon a very large proportion of purely agricultural tonnage, live-stock and grain.

ANOTHER CANADIAN PACIFIC

Curiously enough, both roads are at present engaged in constructing and operating a great irrigation System. The Canadian Pacific System on the Bow River and the Buenos Ayres System in the Rio Negro Valley came into being from the same cause, namely, the desire of the two roads to populate and bring into cultivation great areas of country, which had in them all the ingredients of agricultural success except water.

This parallel is interesting not so much as a purely railroad study as because it points to the possibility that in the Argentine there may be to-day opportunities as great as any that ever existed in our own West, or in Canada. There are four great railroads now in existence in that country. Their figures for last year show the following result:

	Average Miles Operated 1912–1913	Gross Receipts	Receipts Per Mile
Buenos Ayres & Pacific Railroad	3,404	$27,953,066	$8,212
Buenos Ayres Great Southern Railroad	3,544	32,846,724	9,268
Buenos Ayres Western Railroad	1,781	14,530,040	8,158
Central Argentine Railroad	2,994	32,446,730	10,837

These are the old established trunk lines of the Argentine. None of them is exceedingly old. In 1865 the entire railroad trackage of the country was 154 miles. It grew very slowly until 1880. From that time onward it multiplied rapidly. In ten years they added 4,300 miles. In the next ten years, they added nearly 5,000 and in the next ten another 5,000 miles. In the three years from 1910 onward, as many miles of railroad track were built in the Argentine as in any previous ten year period.

The pace of construction is strongly reminiscent of a period in the early 'eighties in the transportation history of the United States, in which we created many thousands of miles of our present railroad system. It may be that in a continuation of this building period, and in the almost certain reconstruction period that will follow sooner or later, will lie the great railroad opportunity of the next generation.

The opportunities for railroad exploitation and development in that country are not being neglected. English capital rarely, if ever, neglects anything that looks like a chance for pioneer work of this sort. The capital of Europe has gone into Argentine railroads very extensively in the last fifteen years and is to-day going into the Argentine faster than it is coming to the United States and almost as fast as it is going into Canada.

A PIONEERING SYNDICATE

From an American point of view, the most interesting thing that is happening in the Argentine railroad field is the activity of a company that was incorporated in Maine on July 12, 1912, under the name "The Argentine Railway." That com-

pany is in part an American company representing to quite a large extent the same interests that, a few years ago, created a very interesting episode in American railroad finance. Under the leadership of Mr. Percival Farquhar, a young and somewhat over-ambitious financier, a group of American, Canadian, and English capitalists undertook the rather dangerous task of buying control of several American railroads to constitute a new trunk line system. The railroads upon which they centred their operations in this country were the Lehigh Valley, the Wabash, and the Rock Island. The episode culminated in a great fiasco, after which the three railroads reverted to their original possessors, taking with them a considerable amount of the free cash and other assets of this group of capitalists.

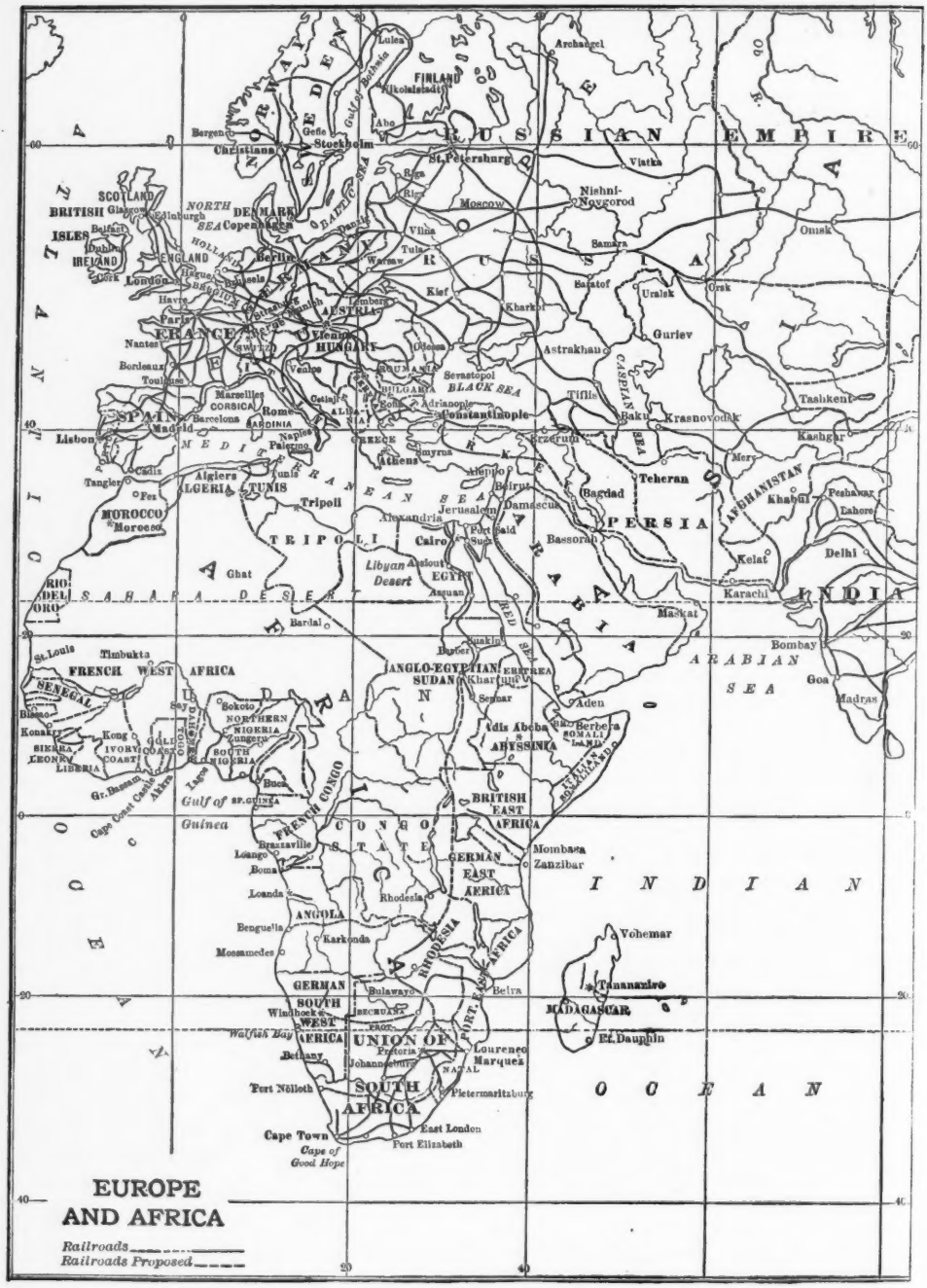
This setback, serious as it looked at the time, did not dampen the ardor of this pioneering syndicate. It did, however, induce these people to believe that there were other fields in the world in which enterprise of that sort might encounter less serious dangers than it met in the wilds of Wall Street. The syndicate had very large interests in Brazil, Bolivia, Uruguay, and Chile, controlling the Brazil Railway, Bolivia Land & Colonization Company, the Uruguay Railway, and the Antofagasta & Bolivia Railway. The Argentine Railway was incorporated to create a new railroad group in the Argentine somewhat on the lines of the attempt that the same interests had made to create a new railroad system in the United States.

To that end a very broad charter was taken out. It allows the company to buy, or build, or lease, or operate railroads, street railways, telegraph, gas, electric light, oil, mining, dock, and various other enterprises, and to deal in land and to do an engineering and contracting business. Under this omnibus charter the company has bought a large interest in the Entre Rios Railways, the Argentine Northeastern, the Córdoba Central, and the Provincial Railways of Sante Fé. According to the literature of the company, the object is to combine these railroads wherever possible and to improve them and bring them up to date "under modern American railroad practices." The combination has a good terminal in Buenos Ayres, and has obtained charters to build a good many miles of new railroad in the agricultural plains of the Argentine. It has also purchased very large tracts of undeveloped land at low prices and is proceeding to cultivate some of them and sell and develop others. Another side line is the purchase of large forests of quebracho, which it is expected will turn out to be exceedingly profitable.

AN EXPEDITION FOR PROFIT

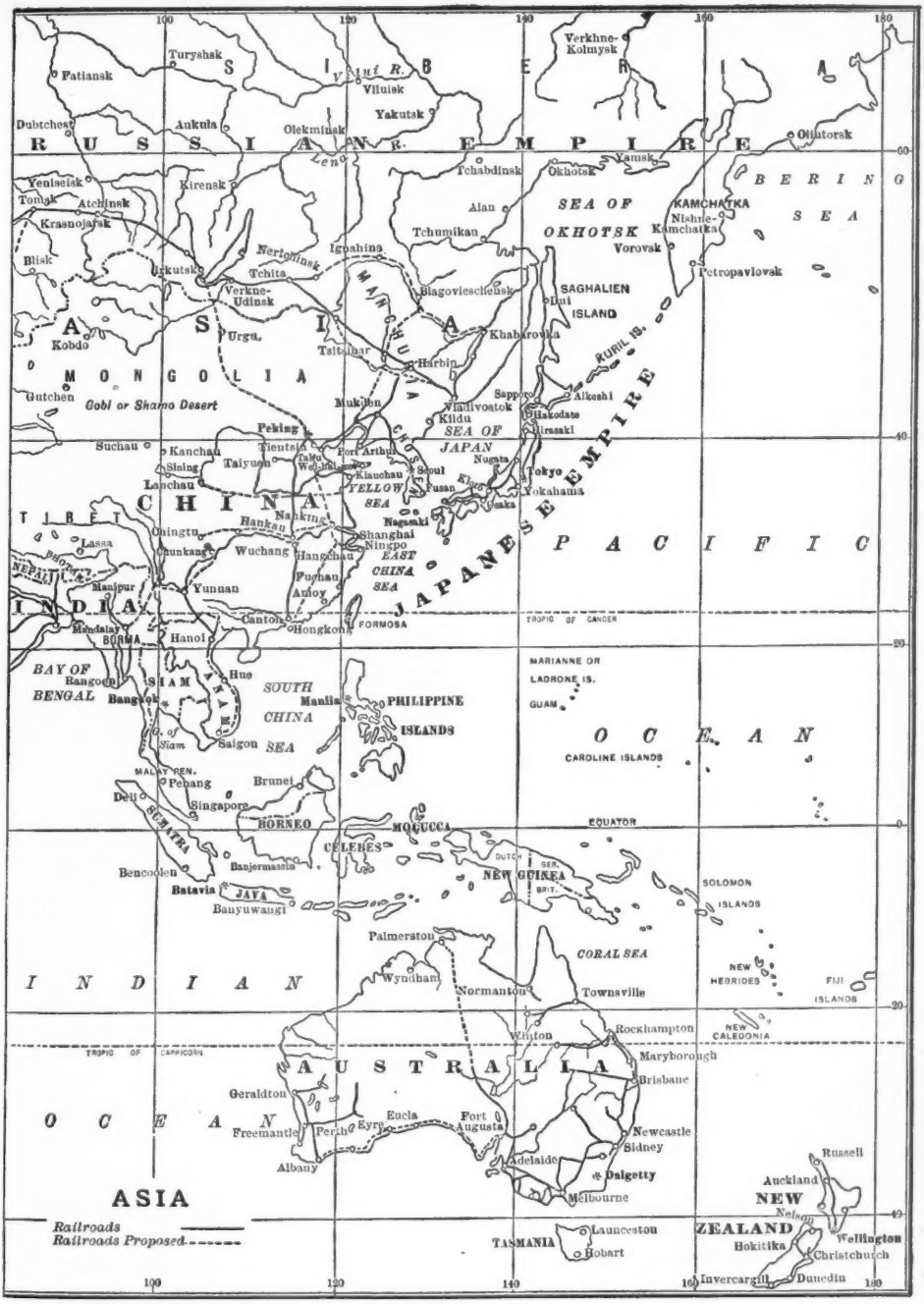
This venture is a typical modern expedition for profit. It is strongly reminiscent in many of its details of the glorious days of the early 'nineties, when men like Harriman, Judge Moore, D. G. Reid, and others were putting together by acquisition and construction new systems of American railroads. It is too early to say whether the operations of this syndicate should be compared with the operations of Mr. Harriman, or with the more reckless, if more spectacular, operations that created the Rock Island, the modern New Haven, the St. Louis & San Francisco, the Gould System, or even the ill-fated Great Central merger. The railroads that the syndicate purchased did not include any of the very powerful Argentine systems, and this fact seems to argue that this Anglo-American syndicate is not likely to become in the near future, by any means, the most powerful interest in Argentine railroads. But when men of an acquisitive character seek railroad power, they are not apt to stop at anything that their capital will justify, and sometimes they have even been known to attempt tasks far beyond them. What we have discovered in American railroad finance in the last two years will not be soon forgotten, nor is it particularly likely to induce private American capital to flow in a continuous stream toward ambitious railroad ventures of the merger class in South America, or anywhere else in the world.

If the Argentine is the most promising railroad field in South America, it is not, by any means, the only one. In fact, the whole of South America is full of stories and records of ventures of the pioneering sort, some of which have turned out well



THE RAILROAD DREAMS AND THE RAILROAD

AMONG THE MAGNIFICENT VISIONS THAT ARE SLOWLY BEING REALIZED ARE THE ALL-RAIL ADELAIDE TO PALMERSTON. ALREADY COMPLETED IS THE ROUNDABOUT



REALITIES OF THE EASTERN HEMISPHERE

ROUTES FROM LONDON TO CALCUTTA, FROM CAIRO TO THE CAPE OF GOOD HOPE, AND FROM BUT IMMENSELY IMPORTANT ROUTE FROM HONGKONG TO ST. PETERSBURG

and some of which have not. In Chile, the railroads of to-day are practically all Government-owned. The Government has just completed the linking of the north-and- south railroads to make a system running from end to end of the country, following the coast line, but at a considerable distance inland. This linking of scattered railroads to make a connected system probably precludes the possibility of much individual exploitation in that country; and the privately owned railroads of Chile are small and not particularly important at the present time.

In Peru, the railroads have a peculiar interest to Americans because the railroad industry in that country had its very beginning in the daring ambitions and curious faith of an American who must have been imbued with the same kind of courage and gifted with the same kind of vision that created the Central Pacific and most of our other trunk lines.

HENRY MEIGGS'S DREAM

Years ago Henry Meiggs conceived the notion of starting a railroad on the coast of Peru which would cross the Andes and connect at some place in the East with the navigable waters of the Amazon. That was one of the great railroad dreams of the last century. The road was started at the port of Callao on the West Coast, ran through Lima, and climbed the Andes. The construction was probably more difficult than anything of the sort that has ever been attempted on the North American continent. During the upward climb of more than 15,000 feet there are more than twenty switchbacks. The engineering feats involved in the building of tunnels and bridges to surmount the Andes have not been surpassed, for daring, in the records of the North American railroads.

The story, so far as the pioneering end of it goes, ends unhappily, as it so often ends all over the world. The work was pushed forward for some years at a tremendous cost, in money and in lives. The actual cost of the road, as it stands to-day, is more than $200,000 a mile, and it is said that more than 7,500 men died of fever or were killed in its construction. In 1877, when the road had reached a little village called Chicla, in the heart of the mountains, Meiggs broke down and died from overwork and strain. At the same time the Government's treasury gave out and it was impossible to push the work forward. The road stopped and was operated more or less unsuccessfully for many years. In 1891 the work was resumed. At that date the Peruvian Corporation came into existence and took over the railroad. It let the contract to complete the line to Mr. William Thorndike, another American, who pushed it forward across the divide, to Oroya, which is now its eastern terminus. The railroad is said to be the highest railroad in the world. It is also one of the highest priced.

THE RICHEST RAILROAD

When one encounters in the records of South American railroads such extraordinary figures as $200,000 a mile, it appears impossible that railroads can be built in that country with any kind of a chance for profit; for $200,000 is far more than the average per mile capitalization of, for instance, the Pennsylvania Railroad. That it can be done on a small scale is evidenced by the São Paulo Railway in Brazil, which is a little road 86½ miles long, that cost more than $200,000 a mile, and that earned last year on its main line more than $100,000 a mile, and was able to pay 14 per cent. on its common stock. The largest part of its earnings come from coffee. It probably earns more money per mile of road than any other railroad anywhere on either American continent, the figure being well in excess of the Pittsburgh & Lake Erie, or of the Panama Railroad, which stand close to the top of the list in volume of gross earnings per mile among the railroads operated by American interests.

In Brazil there seems to be almost as great an opportunity for pioneering work, or for financial exploitation, as in the Argentine, and possibly, as time goes on, it will be a bigger field and a more promising field than any other country in the world. Private capital is given plenty of chance. One finds in that country pretentious holding companies somewhat similar to our American corporations. The

Brazil Railway, for instance, like the Argentine Railway, is incorporated in Maine. It had in operation at the last report about 3,000 miles of road and had about 2,000 miles projected or under construction. Apart from the direct lines owned, it had various other railroads and some companies that were not railroads which it held by stock control. Its whole construction and plan of finance seems to be American except that, like the Canadian Pacific, it carries on various collateral enterprises, like cattle raising, the operation of ports, etc. This year, in partnership with a packing house of Chicago and New York, it has gone into the meat packing business in São Paulo. It has also gone into the lumber business on an extensive scale and it seems likely that sometime it may be a gigantic syndicate of many commercial activities. The interests that dominate it are said to be practically the same interests that are represented in the Argentine Railway, partly American and partly British.

BRAZIL THE NEXT GREAT RAILROAD CENTRE

That central Brazil will be the stamping ground for the great promoters and the future home of railroad finance, high and low, is by far the most likely answer to the question with which this article began. If one glance at the railroad map of South America, he will observe that probably 90 per cent. of the railroad lines in the Argentine are solid lines, indicating that the railroads are already built; but that in Brazil, a very much larger country, a very large percentage of the lines indicated are broken lines, to show that they are not yet built, but are projected or under way. Brazil seems now to be full of promoters, some of them Americans, but most of them not. In this lull in American business enterprise, the British have taken a long lead and have far outdistanced American finance and American enterprise. It may be remembered, however, that in the building of our own American systems of railroads, British capital also led. In fact, practically all the pioneer lines of the United States, both east and west, were floated on the Continent. The systems which to-day we call distinctively American, like the Pennsylvania, the New York Central, the Illinois Central, the Northern Pacific, the Union Pacific, and the Santa Fé, were financed to a very large extent in Europe. The actual conception and promotion of the enterprise was, for the most part, American. The Great Northern was promoted by Canadians and built largely by British capital and is to-day a hybrid property with a very considerable percentage of its ownership still resting abroad.

Therefore, it is not wonderful that in the construction and promotion stages South America should be, from the railroad point of view, largely a preserve for British capital. The genius of American finance is not, strictly speaking, a genius for pioneering. It has often been pointed out that Mr. Harriman built very little railroad, and that the late Mr. Morgan, for all his boundless enterprise and courage, was not primarily a railroad builder. These men, undoubtedly the two greatest railroad financial figures in our history, found their life work not in building new lines through vacant places, but in gathering together the ruins left over from periods of inflation, over-extension, and too much courage, and in re-creating out of these broken properties strong and massive enterprises that were better adapted to stand the test of time and the vicissitudes of fortune.

So, in the future, may some Harriman or Morgan pick up the broken fragments of the great Argentine system, or the great Brazilian system, and put behind them the magic of a great name to draw into the treasury the funds of all the world, just as, in the reconstruction age of American railroads, these transportation and financial geniuses created out of the wrecks of a former period the present railroad systems of our country. Certainly there is no other field in all the world which seems more likely to constitute such railroad dynasties as these men created and upheld in this country during their lifetime. The land is there to be tilled and cultivated. The possibilities of profit are there to be seized and exploited. The foundation is already laid, and the only question remaining is, who will be the builders of the coming generation?

REMOVING THE BLINDING CURSE OF THE MOUNTAINS

HOW DR. McMULLEN, OF THE PUBLIC HEALTH SERVICE, IS ORGANIZING THE WAR AGAINST TRACHOMA IN THE APPALACHIANS — RELIEVING THE PITIABLE CONDITION OF THOUSANDS OF AFFLICTED CHILDREN AND ADULTS, AND SETTING AN EXAMPLE FOR FURTHER WORK TO BE DONE BY THE STATES

BY

CONSTANCE D. LEUPP

TWO years ago a cry for help came from Kentucky. Miles from the railroad, up in the mountain counties, the people were suffering from trachoma. How long it had been rife there, where it came from, and how severe or how widespread it was, no one knew. Only the local health authorities had found that they were unable to cope with it successfully. Then they sent their cry for help to the United States Public Health Service.

It is hardly fair to call trachoma a filth disease, although it owes its prevalence to insanitary living. It is a painful and disfiguring affection which attacks the inside of the eyelid first, resulting in inflammation which in turn as it heals results in scar tissue. It is this scar tissue which, constantly irritating the eyeball, causes the formation of scars across the cornea, producing blindness.

During the progress of the disease, the patient cannot read and the eyes are so intensely sensitive to light that he is in continual pain.

If neglected, the disease will last a lifetime; even when treated its results are apt to be terrible. The scars are disfiguring and cause impairment of sight.

Authorities differ about the proportion of neglected cases that result in blindness; some put it as high as 75 per cent. All agree that it is so high that the disease is a serious menace to the well-being of any community where it gets a foothold.

Though trachoma is classed as "dangerous and communicable," intelligence and ordinary sanitary precautions on the part of a patient will keep it from spreading from one member of a household to another. On the other hand, the common sharing of toilet facilities will from one sporadic case make patients of all the members of a household. Such is the hideous, blinding curse that has fallen upon hundreds of people in the little settlements in the mountains.

Now it is neither the duty nor the privilege of the United States Public Health Service to go into any state and lift from the shoulders of the local health authorities their responsibilities for curbing an epidemic. Ordinarily an epidemic can be handled by a quarantine and is promptly checked if the law is properly administered.

But here the case was different; the stubbornness of the epidemic, the origin of which nobody knows anything about, required a different treatment and one that the health authorities of the state were wise enough to recognize they had not the facilities to command.

First, it required an investigation of the prevalence of the disease geographically and of what one might call its intensity — the proportion of the population afflicted. Next, a demonstration was needed of how to get at and cure those already diseased. Third, a campaign of education to teach the people how to prevent its spread.

The first work was put into the hands of Dr. John McMullen, Passed Assistant Surgeon of the United States Public Health Service, perhaps the best diagnostician of trachoma in the country by virtue of many years' experience in examining immigrants at Ellis Island.

Dr. McMullen is an imperturbable, rather deliberate man of wisdom and medicine. In the summer of 1912 he disappeared into the wilderness on the Kentucky side of the Appalachian Mountains where they form the great divide between Kentucky on the west and Virginia, West Virginia, and Tennessee on the east and south; later he emerged with a report.

"In company with Dr. R. W. Duke, the county health officer," he writes, "I arrived on July 12th at Hindman, the county seat of Knott County, twenty miles from the nearest railroad and reached on horseback over very rough roads. Since my examinations were only for the purpose of determining the prevalence of trachoma, with insufficient time for clinical work, it was a question how best to proceed in order to secure opportunity of examining a sufficient number of people.

THE MOUNTAINEERS' "SORE EYES"

"I found the people much interested and willing to lend their assistance and hearty coöperation to any measure which might benefit the appalling numbers suffering from the 'sore eyes' or 'granulated lids,' as trachoma is known here, and this was particularly true of the doctors of Knott County. The majority of the country schools were in session at that time, but none of the town schools, and it was decided to visit as many of the former as possible, in various sections of the counties, since some communities are much more heavily infected than are others, 60 or 75 per cent. of families being infected in some neighborhoods. These schools could be reached only on horseback, as the roads are bad, often only the rocky beds of creeks.

"The examination of four schools, which was the usual day's work, meant a ride of twenty or more miles. Many persons were examined along the roadside and in the homes in passing, and there was practically never any objection to having their eyes examined, as the people are well acquainted with 'granular lids' and its fearful consequences, usually willing to discuss the subject, and interested in learning matters pertaining to health.

"The investigation included Knott, Perry, Leslie, Breathitt, Lee, Owsley, and Clark counties, in the order named. All these are in the mountains except Clark County, which is in the blue-grass region, but bordering on the mountain counties. A total of 3,974 people were examined, and five hundred of them, or 12½ per cent., were found to be suffering from trachoma in its various stages. The diagnosis of trachoma, for the purpose of this report, was made only in positive cases; those only suspicious were not included, but doubtless some of them were beginning trachoma.

"Of the total number examined, 2,796 were school children from the mountain counties; 338, or about 12 per cent., had undoubted trachoma, while in Clark County, which is in the blue-grass region where living conditions are totally different, only fifteen cases, or about 3½ per cent., were found affected among the 436 school children examined. A total of 3,232 school children were examined.

"If conditions, as found in the child, are to be taken as an indication of what is in the home, certainly a 12 per cent. average of trachoma among the school children indicates an appalling amount of trachoma in the homes of these good and honest people in the mountains.

"Dr. Stucky, a local physician, reports that in one mountain county he examined 100 cases in two days, 25 per cent. of whom had trachoma or other infectious disease of the eyes. Also in another mountain county he 'examined more than 200 cases; 25 per cent. and more of these had trachoma. Many of them were the most pitiful and hopeless I had ever seen.'

"It is obvious that trachoma is plentiful, but it is difficult, outside of schools and public institutions, to secure the examination of sufficient numbers to give exact percentages. However, on the opening day of court week in a county seat, I examined the eyes of 245 people in a routine manner, regardless of whether any diseased condition existed, and found that 45 of them, or about 18 per cent., had trachoma, and about 10 per cent. showed corneal complications. The ma-

jority of these were men, heads of families, from all sections of that county.

IDENTIFYING RELATIVES BY TRACHOMA

"In examining the eyes of school children it was my habit to request the teacher to write down the names of such pupils as had trachoma, and I was able in this manner to pick out entire families, as all usually had the disease. In many cases the teacher informed me that some of the worst cases were not in school that day and were often absent on account of 'sore eyes.' In one particular instance the teacher volunteered to send for the remainder of the children, and produced seven of the worst cases of trachoma I had ever seen, much like the old 'Egyptian ophthalmia' formerly seen among immigrants. The remainder of this family were absent from home or the eyes were too acutely inflamed to make the trip to the schoolhouse possible."

So much for the prevalence of the disease. The doctor continues with the same restraint, conscientiously avoiding all exaggeration, to give some idea of what the affliction means to the patient.

"Among the hundreds of cases of trachoma seen among these good and honest Anglo-Saxons of the mountains," he tells of small children, shut up in darkened rooms, getting behind the furniture to shut out all light from the eyes, so intense was the suffering. Many of them had not seen light for weeks or even months. In one of the schools a number of the nearer neighbors were present, and there were cases of trachoma ranging from the acute onset in the small child to those cases in adults which had lasted a lifetime and had ended in total blindness.

Picture a mountain region so remote that the nearest town of any size is, by grace of a casual railroad service conspiring with the miles, a two days' journey away, and as far beyond the ken of the landlocked mountaineers as if it were at the Antipodes; picture an isolated folk peopling this remote and desolate, albeit beautiful, country living into old age with no wider knowledge of the world than that obtained from periodic visits to the county seat, with its four hundred inhabitants.

Large families are the rule on these upland farms. Often there are from ten to fifteen children in one household, and frequently the cabins consist of only one room in which all the members of the family cook, eat, and sleep.

THE FAMILY TOWEL

In some cases the family wash-basin is a large, hollowed-out stone, half buried in the ground near the well, and it is seldom if ever entirely emptied or cleaned; the family towel is used by the whole family for days on end. In winter the cabins, even if they have windows, are hermetically sealed. Many of the children walk for miles over bad roads to ill-ventilated schools.

The pathologist in his laboratory could not prepare a better culture bed for the artificial propagation of illusive and fragile bacteria than these people prepare, by the simple omission of ordinary sanitary precautions in their daily lives, for the sturdy and tenacious germs of trachoma which found their way among them at some unknown time from some unknown source. Consequently the disease has grown and flourished.

Against this fearful state of things, Dr. Stucky, of Lexington, Ky., has been making a plucky single-handed fight for years. Under the auspices of the Woman's Christian Temperance Union Settlement at Hindman, he has been conducting semi-annual clinics. With the help of Miss Butler, the trained nurse at the Settlement — known throughout the region as "the angel of the mountains" — he had succeeded in giving temporary relief to five or six hundred cases a year.

As Dr. Stucky well realized, these clinics merely scratched the surface. How was the Public Health Service going to handle the situation?

There was no precedent except the work of the British Government in India. And since the British Government is spending millions of dollars in stamping out trachoma among the natives, there seemed little in its example that Dr. McMullen could follow. For Dr. McMullen was canny enough to see that the most unwise policy he could follow would

be to spend much money, even if the Service gave it to him. For his task was to teach people who were very poor how to guard themselves against the disease. Manifestly, he could do this seemingly easy thing only by getting the best possible results from the simplest possible equipment and by spending the least possible money in his demonstration work.

To gain the confidence of these simple, proud people, miracles were not amiss, nor was the doctor averse to appearing a little like a magician.

THE MAGIC OF THE HEALER

How could the teacher and the pupils tell, when he walked into a country school and picked out which children were brothers and sisters, that his practised eye was spotting case after case of the disease? And when patients came to him with things less stubborn than the trachoma he was studying, and a drop or two of atropin cleared their vision in a twinkling, was it strange that tales of the healer began to travel back to the landlocked hamlets of the mountains?

So, using these experiments of his investigating trip as his cue, Dr. McMullen thought out how to begin his campaign against the disease, and he opened that campaign last fall.

In Hindman, the county seat of Knott County, the ranking metropolis of the region — four hundred inhabitants, twenty miles from the railroad — he established the only hospital to be found within a two days' journey.

It was not an imposing structure; it was reassuringly familiar and yet oddly strange to the eyes of the natives. It was one of the plainest of the old town houses, rented for ten dollars a month, remodeled for convenience, freshly papered and painted and scrubbed. Behind it, in place of the old iron waste pipe that had carried sewage into the brook according to the custom of the neighbors, two barrels, a T pipe, and a bit of wire screening arranged themselves into an inexpensive but chemically correct septic tank.

"Tell everybody to come!" the word was passed around throughout the country for miles. "It's *your* hospital; now come and celebrate its birthday-party." Notices were sent to the churches and the schools, and when the great day came, the people came, too, the well and the sick, the halt as well as the blind. And all brought flowers until the placed looked like a garden.

THE FIRST HOSPITAL

There was the simple little building with nothing to distinguish it from the houses about it except the big American flag and the truly wonderful cleanliness. At the shining windows were clean shades and fresh curtains, the latter made of inexpensive Hindman muslin. Under foot, in place of the old begrimed boards, was a spotless white flooring due not to the carpenter's art but to a liberal application of sand soap and elbow grease. And there, between the rows of flower-decked beds with their white spreads, each embroidered with the coat of arms of the Public Health Service, stood the beaming doctor, resplendent in full dress uniform, and three smiling nurses in their starched white dresses.

It was a vision of simplicity and cleanliness; a miracle of kindliness and common sense. And to many of the mountaineers who had come in from the upland farms where they dwelt in dire poverty and isolation, it was a revelation.

And the wonders of modern medical science began at once.

For among the visitors that first day was a blind old man who had been led there on foot, stumbling over the roads, from his home fifty miles away. The diagnosis revealed not trachoma, but cataract; he was operated on and put to bed. Ten days later he was home again; and he was able to see, for the first time in twenty years.

And far and near spread the tale of his recovery, and of the recovery of others who followed his example.

From another neighborhood came a family of three, a young man, his wife, and their child. The girl had somehow escaped. The man and the baby were both afflicted and in great pain, with cloths tied around their eyes. For a hundred days, as the man expressed it, he had been blind.

Two weeks later, after the young father had been operated upon and had been released from his confinement in a darkened room, he looked around him and saw; and he heaved a great sigh.

"'Fore the Lord, I didn't die!" he burst forth, venting for the first time all the terror and doubt which had been pent up within him during the days of his long and tedious treatment.

"When I lef' home the folks all said, 'Ef you go down there to the hospital they'll put you to sleep and it 'pears like you won't wake up no more.' I'm goin' back to Painter's Creek to tell them *it ain't so!*"

So back they went rejoicing to tell the story to the wondering neighbors; he and his baby were not cured but vastly improved. And in their hands the parents carried medicine, in their heads some concrete ideas on sanitation, and in their hearts an abiding faith.

And so the gospels of cleanliness and health are slowly spreading.

"THAT HALP A-POWERFUL"

Some one has said of these simple and lovable people that under the calm exterior they boil like a kettle of water. Of stoicism under the knife there are many cases. Dr. Stucky reports of one old woman that after a difficult operation on one eye she drew a deep breath and exclaimed:

"That halp a-powerful, doctor! But if you'll just whittle a bit off the other eye it'll halp a lot more!"

It was last September when the Hindman hospital was opened. In November its twin was opened in Hyden, the county seat of Leslie County, an equally remote and equally tiny metropolis. At the close of March the third demonstration station was opened at Jackson, on the railroad. Up to June 6th, when the oldest had been running only nine months and the newest as many weeks, there were 6,726 treatments, 521 hospital cases, and 549 operations to the credit of the three hospitals. And this notwithstanding that winter is the off season when supplies are brought in with difficulty on muleback and patients find it hard to get into town over the frozen roads.

Dr. McMullen now has a central office in Lexington and a doctor and two nurses in residence at each hospital with a head nurse in charge of all. Each hospital is costing approximately $25 a day to maintain, including salaries, and the three are covering an area of one hundred square miles with their merciful services. Besides the actual treatments, the hospitals are centres for a great educational propaganda; Dr. McMullen has sent simple literature on how to guard against and how to cure trachoma into every household in four counties; he and his assistants seize every opportunity to lecture on it in schoolhouses and in churches, in and out of season, whenever and wherever the occasion presents itself.

In this way the Public Health Service has made a very telling demonstration of what any county could do at the moderate cost of $9,000 a year. It hopes that eventually the states and the counties will take over the work and carry it forward.

And meanwhile, besides this intensive study and demonstration work at the point where the disease was most rife, the Service is completing its job by finding out where else it exists.

Over in Jefferson County, across the state of Kentucky, the 35,297 school children have been examined and the name of every child with trachoma is known to the local health authorities. And on the eastern watershed of the Appalachians, through West Virginia, Virginia, down into the Carolinas, into eastern Tennessee and Georgia, the doctors of the Public Health Service are at work studying and reporting on the eyes of 70,000 school children, while, scattered through the Western states, fifteen other doctors are at work among the Indians.

Before it gets through, the Health Service hopes to make a complete demonstration of how to make trachoma in these states as extinct as the dodo.

WIRELESS UNDER THE WATER

A REMARKABLE DEVICE THAT ENABLES A SHIP'S CAPTAIN TO DETERMINE THE EXACT LOCATION OF ANOTHER SHIP EVEN IN THE DENSEST FOG — A NEW SAFEGUARD AGAINST THE DANGER OF COLLISION AT SEA

BY

BURTON J. HENDRICK

IN THE latter part of May the *Empress of Ireland*, a Canadian Pacific steamship, sank in the St. Lawrence River, losing more than 1,000 passengers. A Norwegian collier, hurrying in a fog, struck the great passenger vessel amidships. It is easy enough to moralize upon the responsibility for this accident. As this is written, a learned commission is taking voluminous testimony. In the mind of the ordinary observer, however, the diagnosis involves no particular difficulty. The simple fact is that these ships were navigating in a fog. They had no means of notifying each other of their respective positions. Whether one was sailing fast and the other slow is important as indicating carefulness and a sense of responsibility in the respective commanders. The same accident might very well have happened, however, had both vessels been proceeding cautiously. The ultimate cause of the disaster was the fog. As long as shipmasters have no way of protecting themselves against this treacherous enemy, collisions precisely like this will take place.

About two weeks after the *Empress of Ireland* disaster, a tug boat, the *Neponsett*, with a party of scientists and newspaper men aboard, was lying near Boston Lightship. The man in charge, Prof. Reginald A. Fessenden, stood on the deck with an ordinary telephone receiver to his ear. The night was dark; the sea choppy; the atmosphere on the tug one of tense expectancy. For a considerable time Professor Fessenden stood at the telephone patiently waiting. Suddenly a smile crossed his face and he shouted, "I've got her!"

The telephone receiver was passed around one by one to the professor's guests. There came from it unmistakable, sharp, staccato sounds: dots and dashes of the Morse code resembling somewhat the snappy buzzing of the Marconi wireless. The sounds kept going for nearly two hours, until nearly midnight. About an hour after they started, the lights of the collier *Devereux* appeared from the general direction of Cape Cod. As she came nearer and nearer, the soundings in the telephone receiver became louder. The collier *Devereux*, in fact, was sending these signals. When they began it was thirty-one miles away from the tug. The first signals, therefore, sounded faint; as the ship drew near, however, they became almost shrieks. One could hear them without the telephone. The dots and dashes represented an entirely new kind of wireless. Unlike the Marconi and other systems of sending messages, this new kind of telegraphy does not come through the air. It comes through a much more efficient sound conductor — the water. Over the *Devereux's* guardrail, well sunk in the water, hung a queer looking metallic contrivance, suggesting in shape somewhat a kettle drum. Over the *Neponsett's* side hung its twin. Each was furnished with a copper diaphragm, which oscillated 5,000 times to the second, making the shrill musical sound already described. These sound waves traveled through the water at an immense speed, and, striking the diaphragm on the *Neponsett*, made a kind of phonographic record of themselves. Telephone wires carried this record to the listening ears on deck.

Imagine, for a moment, that the *Neponsett* and the *Devereux* had been steamships navigating in a fog, like the *Empress of Ireland* and the *Storstad*. Clearly they could have kept the closest track of each

other for a distance of thirty miles. All this time each would have known precisely in what spot of the sea the other was. There would have been no guesswork, and one could not have rammed the other except in full consciousness of what it was doing. It could pick out its ship in the dark or in the fog as unerringly as in a bright sunshiny day. This is what makes the new Fessenden signalling system valuable. It is the one thing that gives it an advantage over a foghorn or wireless. It tells you, without deception, where it is. Neither foghorns nor wireless are able to do this.

They cannot do it because these methods of communication use a very faulty medium for the transmission of sound — the atmosphere. The air into which we speak carries our voices most deceptively. It has no uniform density; it is constantly filled with agitating cross currents and areas of different temperature. When the sound waves start in the air, therefore, almost anything may happen to them. They may go up or down, or right and left; they may travel in a circle, or even sharply turn corners. Under ordinary circumstances, it is practically impossible to distinguish the direction whence they originally come. The everyday foghorn constantly illustrates these vagaries of the air. The nations have spent many millions of dollars in equipping foghorn stations; and no steamship goes to sea without a horn of its own. The skilled mariner, however, knows that there is nothing more untrustworthy. In a dense fog a blowing horn terrifies rather than encourages. The captain knows that a ship is somewhere near, but often he has not the slightest idea where. The sound may seem to come from the north and really come from the south; it may seem far distant and actually be near at hand. One particularly annoying phenomenon is the zone in which there is no sound at all. The horn may blow in a certain place; an air current may then take the sound up, lift it far above the ship, and deposit it at sea level again several miles away. That is, a near-by ship may not hear it at all, though one at a great distance may hear it perfectly. This is the reason why disasters in fogs, under present conditions, are inevitable, however skilful or conscientious the navigators may be. So long as men depend upon the air for their sense of sound direction, they will fall into frightful calamities.

THE WATER AS A CONDUCTOR OF SOUND

But there is one medium of sound conveyance that never leads one astray. This is the water. The water is uniform in density and practically uniform in temperature. Consequently, sound in the water always travels in straight lines. Strike a bell under water, and the sound waves immediately start in all directions at uniform speed and in straight lines. The sound travels farther and much more rapidly than in the air. It also makes more noise. For many centuries men have been acquainted in vague fashion with this phenomenon of sound transmission.

Slowly, of course, but ultimately, it occurred to several people that this principle might have practical applications. Why not use it for signalling from the shore to passing ships or from ship to ship in transit? The value of such a device in protecting ships from reefs and shoals, and from each other, was clearly apparent. In the latter part of the nineteenth century inventors in several countries set themselves this task. The literature of the subject contains a large number of experiments and patents. The problem, however, involved many difficulties. One thing was easy enough. A bell, struck under water, could be heard on a ship at a distance of several miles provided only that the ship was standing still. A pneumatic speaking tube, sunk in the water, or one of several telephone contrivances, caught the sound fairly well. But the trouble started when the ship began to move. For then numerous other noises started up, in addition to the striking bell. The swish of the water on the side, the churning of the propeller, and the vibration of the machinery completely drowned the tinkle. The real problem, therefore, was the invention of a contrivance that preserved this bell sound above the roar of the other noises. Prof. Elisha Gray, famous for his labors on the telephone, was work-

ing on this when he died. Mr. Arthur J. Mundy, of Boston, captured the secret in 1901. He constructed a small tank, which he riveted to the skin of his ship on the inside. He filled this tank with sea-water, and in the water placed two microphones, connected, by wire and telephone apparatus, with the bridge of the ship. The sound waves of a sunken bell would travel through the water, strike the side of the ship, go right through the steel and into the water in the tank. Here the microphones would take up the sound and transmit it over the wire to the captain's listening ear on the bridge. Above the roar of the fiercest storm and the dashing waves on the side, the striking bell could be heard with the utmost clearness.

DIRECTION FIXED WITH CERTAINTY

Perhaps the most interesting part of the invention was the way the captain located the direction. As I have already said, there is nothing uncertain about this; the submerged bell does not play tricks like the foghorn. This is because the sound waves under water travel always in straight lines. Still, they travel in all possible directions: up and down, right and left — like the ripples caused by dropping a stone into water. How, then, can the captain, when he hears the ringing, know where the sound is coming from? If he heard only one sound he could not tell at all. But each ship contains two tanks, one on each bow. As the captain listens, therefore, with two telephone receivers, one to each ear, he usually hears two sounds. One, naturally, is considerably louder than the other—the one, that is, which is turned most directly to the bell. The captain then turns his ship, until the other side catches the bell more distinctly. By manœuvring his ship for a few minutes he finally gets it in a position where he can hear the bell with equal distinctness on both sides. He knows, therefore, that his vessel is pointing directly at it — that is, he knows the direction whence it comes. To keep out of danger, all he has to do is carefully to steer his ship away from this direction. A captain that would steer in the direction of such a bell would steer directly with eyes open at a reef.

This invention, however, was useful only in protecting ships from shoals and rocks. The bell was always stationary on shore; only the receiving apparatus moved, on the ships. Few understand, however, the wonderful progress this signalling apparatus has made in the last ten years. It is no longer a submarine curiosity; it is an every-day, practicable fact. Nearly all the civilized governments are rapidly equipping the dangerous spots on their coasts with submerged bells. The United States, the home of the invention, has fifty-two in Pacific and Atlantic waters and on the Great Lakes. Canada, England, and Germany are rapidly protecting their coasts. Even China is beginning to put them in. Many of the great ships have the receiving apparatus. The captains find the bells useful in laying their course. The transatlantic liners now invariably make Nantucket Light by picking up, long before its light can be seen, its constantly striking submarine bell. They find it to a certainty even in the densest fog. There are now twelve hundred ships equipped with this apparatus; these include those of the greatest lines — Cunard, White Star, North German Lloyd, and the rest. Nearly all the United States warships likewise carry the protecting tanks.

The *Empress of Ireland*, which went down in the St. Lawrence in late May, had the submarine signal; it was useless, however, as a protection against another moving boat. Professor Fessenden's new device, recently tried out in Boston harbor, meets this particular need. He has solved the problem of submarine signalling from one moving ship to another. In this experiment at Boston he succeeded in communicating at thirty-one miles; such a great distance, however, is not necessary. For protection against fog, clear signalling at a distance of five or six miles suffices. If one ship can precisely locate the position of another at that distance the densest fog has no terrors to navigators. This the new Fessenden apparatus does easily. It is safe to say, therefore, that there is only one remaining danger in fogs at sea, and that is human fallibility. Shipmasters now have an instrument which really gives

them a sense of touch in the foulest weather. They can locate a sister ship as distinctly as they can see a lighthouse on a clear night. It remains only for them to use it intelligently and conscientiously.

ITS USE IN RESCUE WORK

Besides locating other ships in a fog, the new contrivance has other important uses. It has particular value as completing the work of wireless. In recent years nothing has touched the imagination quite so much as the wireless signals sent out by ships in distress. By itself, however, the wireless call for help is not complete. The wireless can summon other ships; it gives them only indefinite instructions where to come. The captain sends his position, as best determined under the circumstances; before the rescuing ship arrives, however, it may have considerably changed. Indeed, unless the skies are clear and the sea calm, it is difficult for one ship at sea to find another. They may wander around for hours, when they are only four or five miles apart, without catching a glimpse of each other. In fog or rough weather, they may almost touch hands and yet remain unconscious of each other's progress. The search of the *Baltic* for the *Republic* — the first rescue in which wireless figured conspicuously — illustrates this perplexing fact. The sea on this night was extremely foggy. As soon as Captain Ransom, of the *Baltic*, received the *Republic's* hurry call, he made rapidly for the indicated spot. But he could not find the vessel there. He zigzagged around for twelve hours, traveling about two hundred miles in a square distance of less than ten miles. Several times he must almost have run into the *Republic*: he was within a hundred feet before a faint green light, shining dimly through the fog, told him that he had reached his quarry. The ship fortunately remained afloat; but the twelve hours taken up by the *Baltic's* search gave it plenty of time to sink.

There was another remarkable case in January of the present year. The Hamburg-American *Abessinia*, crippled by a great storm, sent out the usual wireless. Two ships, the *Cedric* and the *Armenian*, arrived on the scene at almost the same time. The *Armenian* signalled to the *Cedric* that she could see the lights of the drifting *Abessinia*. The captain of the *Cedric* assumed that the disabled ship was properly taken care of and resumed his own course. Soon after he had left, the fog sank again between the *Abessinia* and the *Armenian*. When the *Cedric* passed out of wireless communication, the *Armenian* was still blindly groping to find the disabled vessel. The *Abessinia* was not lost, but the experience illustrates the difficulty of finding a drifting vessel in a foggy and dirty sea. A few months ago the *Carthaginian*, bound from Rotterdam to New York, caught fire and sent out a wireless call. The *Uranium* started to the rescue, but groped around for three days without finding the slightest trace of the lost vessel. Happily, the *Carthaginian* succeeded in putting out the fire.

No, success at rescue demands some more definite way of fixing position. This new submarine signalling contrivance does this completely. A ship equipped with both this and wireless could hardly come to grief, provided the captain used them conscientiously. In case of accident, the wireless call would give the ship's general position. As the rescuing vessel approached this general location, the captain, standing on the deck with two telephone receivers, one at each ear, would hear the buzzing instrument of the other ship. On one side the noise would be fairly strong, on the other fairly faint. He would manœuvre his vessel until he caught the signal with the same distinctness on both sides. He would then know that the disabled ship was precisely in front of him. He would then steer directly in the direction of the sound. No more zigzagging — no more wandering blindly in the dark. He would have a point at which he could directly steer. With this same contrivance he could easily telegraph, using the Morse code, with the other captain. One of the possibilities is that he might even telephone. Already, with this apparatus, people have telephoned a distance of half a mile. As a medium for wireless telephony, the water is clearly more useful than the air.

THE EFFICIENT VACATION

FACTORIES AND BUSINESS OFFICES THAT STOP ALL WORK FOR TWO WEEKS IN THE SUMMER — HOW THE PLAN SAVES WASTE AND CONFUSION — OTHER SUCCESSFUL DEVICES FOR INCREASING THE USEFULNESS OF THE SUMMER HOLIDAYS

BY

JANET RUTH RANKIN

IN THE summer months, a whole business organization, like the individuals composing it, is apt to be troubled by a disease — the vacation disease. When one group of employees goes away for two weeks, and then another group for two weeks more, you have a continuous state of disruption in the business as a whole. The summer months are poor months for trade on just this account. Business is slack because business is inefficient.

And so has arisen the Efficiency Vacation. This is literally a resting of the whole organization at one time, for the ultimate well-being of it and its members. The prescription runs somewhat like this:

VACATION NOTICE

The employees of our general office, factories, and sales offices everywhere will take their annual vacation from Saturday night, July 25th, to Monday morning, August 10th, this year.

Emergency orders only, for new equipment, repairs, or supplies, received by mail or telephone, will be cared for during this time as at other periods of the year.

Many business heads, especially those of the old school, boast of never having taken a day from work in uncounted years. Others, a fortunate few, follow the doctrine of the firm in Indiana which insists on a week's holiday every two months as a minimum for proper clear-headedness on the part of its assistants. Almost every modern business admits the necessity for holidays of some sort. Until the millennium turns work into play, men will claim their right to periodical leisure, and so long the vacation problem will have to be reckoned with.

And it is a problem. Go into an office with a request that means exact and detailed information, toward the last of July. Mr. Adams isn't here to tell you about this point; he is fishing in Canada. His brother is in town, but he leaves for his vacation this afternoon, and he is away packing now, presumably. Mr. Maxwell, to whom you are talking, will address you as from an immeasurable distance; and of course the information you require will be immeasurably farther away — perhaps on the shores of some lake in Maine.

Vacations are a problem from the standpoint of the business head also. Ask any business man what it means to the total receipts of the business to have to hire and break in new help for the summer months. When the original force tries to meet the total work, four men must do five men's work for ten weeks, as they individually take their recreation time. The results to the business are obviously bad.

That an entire business should take a vacation seems at first glance foolhardy, in these days of continued effort and vigilance as the price of dividends. That such a policy should bring increased earnings to the company seems still more unlikely. But a simple problem in arithmetic will show the basis of the action. There are twelve summer weeks in the year. Take ten weeks of full business activity, and two weeks of no activity, and compare the sum to twelve weeks of half way efficiency. The result has been the Efficiency Vacation, as practised by the Elliott-Fisher Company, of Harrisburg, Pa.

Here the work of the general offices, factories, and sales offices everywhere, in this country and abroad, is suspended for two weeks in the late summer months. The

plan has been in use for four years. June, July, and August had always been looked upon as dull months for business in the Elliott-Fisher Company. This was so because a certain percentage of the employees were away during all that time, and the work was consequently in a state of disruption. In the small branch offices the conditions were even worse than in the large ones. Elliott-Fisher maintain sixty-six branches here in the United States and seven abroad. In many of these only one man carries on the work, or at most a manager and assistant. In these offices, that they might keep open all summer, new assistance had to be procured merely for the two weeks when the manager was out of town. This added appreciably to the expenses of the business, and the new help, with no special responsibility or knowledge, was inefficient.

Business would be practically at a standstill for the holiday period, and worse: it would often take the returning manager days or weeks to get the books and general system into shape for work again. Almost as well have no vacation, the managers thought, as to have one that is haunted by the spectre of inefficient work back at headquarters.

HOW THE PLAN WORKS

For many years before 1911, when the general vacation was instituted, the Elliott-Fisher Company had closed their factories for two weeks and gave the employees that amount of rest without pay. This offered opportunity for the thorough overhauling of the factory equipment. Emergency orders could be filled at this time by keeping on a very few assistants.

The idea of the general vacation was taken from the partial one. The management decided that all the departments could be closed for the two weeks with advantage to the work in general. Not only the employees, but the business itself, needed a vacation for efficiency, to avoid the condition of summer disorganization.

The vacation was set for the first two weeks in July, and notices were sent out for three months beforehand to the patrons of the firm, notices similar to the one I have quoted. Then, on the first Saturday in July, the office work was laid down just as usual on a Saturday evening, with the sole difference that it lay for fifteen days before being taken up again just as usual on a Monday morning. Most of the vacations carried full pay. The rule is, a day for a month of service; otherwise, vacation is without pay. Only one or two persons are left in the office to take care of necessary business. But in the several years of the Efficiency Vacation in this firm, Mr. Watt, the president, says there has been only one complaint from patrons during the vacation season.

Last summer the total of orders received for future delivery in the New York office of the Elliott-Fisher Company during the holidays was greater than during any other two weeks of the summer. However, the total of business at this time is, of course, smaller than the average, and this has led to the one change which has been made in the plan. It made the showing for July very poor to have half of the month wasted so far as business activity was concerned; also, the employees preferred, almost unanimously, to have their rest a bit later in the summer; so the vacation was changed to the last week of July and the first week of August. This year it is from July 25th to August 10th.

The vacation weeks themselves have not been directly productive of dividends to the stockholders of the company; that would be absurd to maintain. But the business as a whole has shown in the last two years a noteworthy improvement for the three summer months. This is certainly due to the increased organization and effectiveness of the work of the season, when the respite from work is given all at once, with a minimum of confusion.

OTHER VACATIONS IN FACTORIES

A good many factories, such as the Brown & Sharpe Manufacturing Company, of Providence, R. I., close down for two weeks during the summer season for an Efficiency Vacation. At this time cleaning is done, repairs are made, new machinery is installed, and the old is generally overhauled and put into condition. The Elliott-Fisher Company once utilized this time to move its

whole outfit of machinery to another plant, so that when the employees returned to work they simply took up their tools in different surroundings and went on working with no delay.

Many factories have a slack season at some part of the year, when the work automatically stops, or nearly so, with results much the same as those obtained by the Efficiency Vacation. Shoe factories close for two weeks twice during the year, at the end of their semi-annual "runs" of work. Clothing factories clean and re-organize their workrooms while the workers are idle, waiting for the new styles that will again set designers to planning and sewing machines to humming.

CLOSING THE OFFICE FOR TWO WEEKS

But in straight office work the Efficient Vacation can be managed as well as in factories. For example, the Alexander Hamilton Institute sends out notices to its patrons very similar to the one quoted at the beginning of this article, and shuts up shop for two weeks in late summer. All the office employees go off to take their ease, except one or two responsible persons who are left to handle any money that may come in and to answer any urgent orders or requests for information.

By giving the vacation to all at once, the continuity of the office, its first essential, is preserved. The work simply cannot be laid down in segments, to be taken up by unaccustomed hands or to be neglected for a period, and continue efficient.

The Baker-Vawter Company, of Benton Harbor, Mich., has adopted the Efficiency Vacation among its sales force. This firm employs about one hundred salesmen. Of these, during the last two years, eighty-five or ninety have taken their vacations during the first half of July, and the remaining few the next two weeks.

In some businesses, the giving of vacations in any quantity, at any stated time, is an impossibility. The great mass of routine work in many banks prevents any great number of employees from taking their rest at any one time, and the percentage whose vacations fall in July or August is often very small indeed. On the other hand, Wanamaker's, Altman's, and Lord & Taylor's, three of the foremost department stores in New York, have gone far in the other direction. They decided this year to close their stores for the entire day, on Saturdays, in July and August.

HOLDING THE QUITTERS

The problem of keeping employees after the vacation time has been dealt with by the Stetson Hat Manufacturing Company. This firm found that frequently a man would work half a year — that is, long enough to earn a vacation with pay. He would go off and take his vacation with pay, and then would not come back to work after it was over. The trouble and waste of breaking in new employees during the summer months was very burdensome. But the Stetson Company decided to offer a bonus to those of its men who would remain in their employ for a full calendar year. If a man came in on the first of January or before, stayed through the summer (with vacation, of course) and then stayed on till Christmas, he was given, as a mark of appreciation on the part of the firm, a bonus for a Christmas gift. These bonuses have increased progressively from year to year, and the system has been most satisfactory in its results.

A group of employees in a large flour mill of the Middle West maintain a summer camp at which they all spend their vacation. This thing is done for the employees by the Pierce Undertaking Company of Los Angeles, Cal., who send their men in relays throughout the season to a beautiful spot high up in the mountains.

In the National Cash Register Company, the length of the vacation an employee gets is contingent on his punctuality through the year. One year's service entitles him to one week's holiday. In addition, if the employee has been late, but not absent, or absent, but not late, he gets three days more. If he has been neither late nor absent, he gets two weeks in all. A great many of the employees earn the two weeks' rest.

In these ways and many others, the vacation time, instead of being a direct waste to the business, may be made into a constructive force.

THE AMERICAN CREATOR OF THE ALUMINUM AGE

CHARLES MARTIN HALL, INDUSTRIAL CHEMIST, WHOSE RESEARCHES TRANSFORMED ALUMINUM FROM A PRECIOUS METAL TO ONE OF COMMON COMMERCIAL USE — HOW IT IS REPLACING STEEL AND COPPER AND WHY IT MAY GIVE THE NAME TO A NEW ERA IN INDUSTRIAL ARTS

BY

JOHN M. OSKISON

IT IS not boasting in these days to say that we are capable of creating a new metallic "Age" within two generations — almost within one lifetime. We have done it; and the credit goes to the workers in industrial laboratories. Consider the story of Charles Martin Hall, a modest, patient investigator, and of his work with aluminum.

Aluminum is the most abundant metal. Deville, an early French experimenter, declared that every clay bank is a deposit of the metallic earth from which it is extracted; last year, four states — Alabama, Arkansas, Georgia, and Tennessee — contributed the 210,000 tons of bauxite (the ore from which aluminum is taken) that was mined for manufacture in this country.

THE HISTORY OF ALUMINUM

AS TOLD BY ITS PRICE

1855	$90.00 a lb
1857	22.50 " "
1862	12.00 " "
1886	12.00 " "
1888	5.00 " "
1914	.18 " "

Knowledge of how to use the metal is growing. In 1908, our production was 11 million pounds, and the latest figures show that last year we imported 27 million pounds to supplement a home production of 65,500,000 pounds. It is cheap enough already to have become a real competitor of copper and iron; and to-day manufacturing facilities in the United States are being increased at a rate which foretells such a vast development in the use of aluminum within a few years as will make the present output seem insignificant.

Three and a half years ago, when Charles Martin Hall received from the chemists of America the Perkin medal, the presentation was made by Dr. C. F. Chandler, of Columbia University. Full of years and honors himself, Dr. Chandler reviewed his own connection with the history of aluminum and explained his life-long interest in it. In one way, Dr. Chandler's experience covers the whole history of the period in which the metal has been known.

As a student of 18, in 1854, young Chandler heard Wöhler's account of his discovery of aluminum in 1827. Wöhler's lecture opened to the vision of the student a new element, a still-fresh miracle of the scientist's laboratory, its possibilities all unrealized. Later, as teacher and investigator himself, Dr. Chandler followed the patient, intelligent work of Mr. Hall, and saw it flower into an actual new industrial epoch.

A hundred years before young Chandler heard Wöhler's lecture, a chemist named Margraf found a peculiar chemical earth in alum. He thought it contained a metal, and he called it "alumina." His researches, however, brought to light nothing more than the name. Half a century later, in 1807, Sir Humphry Davy tried reducing this "alumina," and succeeded in producing an alloy of metals — but still the metal aluminum was unborn, and it was twenty years later that

Wöhler tackled the problem. With potassium, Wöhler was enabled to reduce aluminum chloride to a gray metallic powder. The first bit of this metal he ever saw was shown to young Chandler in 1855 by a chemist named Rose; so precious was it that a pound was worth $90.

ALUMINUM AS JEWELRY

Louis Napoleon became interested in the story of the gray powder and the possibilities of its conversion into a new sort of metal. He subsidized Henri St. Claire Deville, who under took to establish a factory for the production of aluminum. That was in 1854. Up to 1888, Deville's plant continued to turn out the metal and its manufactures, reaching a maximum production of 5,000 pounds a year. This was practically all converted into small fancy articles — rings, brooches, statuettes, thimbles, souvenir bars, and wire coils. In Paris, in 1869, Dr. Chandler paid $9 for a four-ounce basket that was made of aluminum.

Between Deville and Hall in the history of the development of the aluminum industry came Hamilton Y. Castner, who studied under Dr. Chandler. Castner's discovery was that caustic soda and iron carbide could be used in making sodium instead of the far more expensive carbonate of soda and carbon employed by Deville. Still, as three pounds of sodium were required, in the reducing process, for the production of one pound of aluminum, and as Castner's sodium cost 25 cents a pound, he never reached a solution of the problem of making the metal cheap enough for general use. By 1889, however, he was turning out 500 pounds a day and selling it for $4 a pound.

Very briefly, that was Dr. Chandler's story of the development of aluminum up to 1886, when Charles Martin Hall, a young American graduate of Oberlin College, discovered an entirely new process for making the metal.

ITS MARVELOUS PROPERTIES

Through the minds of alert industrial chemists, of course, had been running the stories of this wonderful new metal whose specific gravity was only two and a half times that of water, which when hammered and rolled became as hard as iron and lighter than glass, and which did not rust or tarnish. Dr. Chandler, for one, had been actively interested in it since 1854, and many other experimenters were working at it.

Charles Hall's father, who was a minister, had in his library a book he had studied — a battered text book of chemistry published in 1841. This came into his son's hands while he was in school. What that author knew about aluminum was contained in this paragraph:

"The metal may be obtained by heating chloride of aluminum with potassium in a covered platinum or porcelain crucible and dissolving out the salt with water. As thus prepared, it is a gray powder similar to platinum, but when rubbed in a mortar exhibits a distinctly metallic lustre. Fuses at a higher temperature than cast iron, and in this state is a conductor of electricity but a non-conductor when cold."

In school, the boy studied chemistry, but when he entered Oberlin College he did not specialize in that science. His course was the usual classical course that is elected by most students. He was one of the serious-minded students of the college who "ate up his work;" yet beyond the boundaries of his own class work his mind went searching for new problems. He read with unusual interest Deville's statement that though every clay bank was a mine of aluminum, the metal was as costly as silver. Surely, here was something worth looking into.

A HINT FROM AN OLD TEXT BOOK

Graduated in the class of 1885, young Hall found his mind full of scientific curiosity concerning aluminum; from Professor Jewett he secured permission to use the college laboratory during the summer, and he hunted up his father's old text book again. He re-read what it said about aluminum; perhaps he got a hint from the book's statement that when fused (that is, heated until it is in a liquid state) the metal is a conductor of electricity. Anyhow, his experiments during that summer and fall were concerned with the effect of electricity on the metallic earth

"alumina." Fascinated by the problem, the young man went after the secret of cheap aluminum in earnest.

First of all, he found that he needed a cheap, practicable method of reducing the metallic earth "alumina" to a fluid condition so that an electric current would flow through it. He wanted an anhydrous solvent (my dictionary says that anhydrous means "destitute of water") — something he could mix with "alumina" and get a fused mass at a reasonable temperature. The summer and fall ran into winter, and the young experimenter still sought a suitable solvent.

In the following February, of 1886, he found it; it was cryolite, a mineral used in the manufacture of soda and glass. Cryolite fused readily at a low temperature, and when fused it absorbed more than 25 per cent. of its own weight of the white powder of "alumina" while still remaining clear and limpid. As young Hall dropped "alumina" into the fused bath of cryolite, he was delighted to see that it dissolved like sugar or salt in boiling water.

A THEORY THAT WORKED

He had made his big discovery; and he was just past the age of twenty-two! Through that clear, limpid bath of fused cryolite and "alumina" he was ready to shoot an electric current and precipitate aluminum. From Professor Jewett he borrowed a battery and made the first trial. It failed, and he reasoned that it failed because he had used a clay crucible; when he substituted a carbon-lined crucible, he got some globules of aluminum; his theory, a revolutionary one among the workers in that field, had been proved sound scientifically.

The task of adapting his discovery commercially remained — a far longer, if not more formidable, job than he had already finished. It was in this further working out of the process and the transformation of the laboratory miracle into an industrial commonplace that Mr. Hall's mettle was tested.

He was very young; his chemical training had been scant — and men with capital were skeptical. Technical difficulties arose. He found that the carbon poles which carried the electric current into the fused mass burned up quickly. Platinum poles resisted the heat successfully, but Mr. Hall knew that this material was far too expensive to use. With certain adjustments of the fused mixture, however, he was able to use cheaper copper poles. It seemed a solution, yet after a year of experimenting he abandoned the mixture as an unprofitable one.

For a long time it seemed that the Hall electrolytic process was fated to join the long list of inventions which are ideal in theory but are damned as impractical. Of course, Mr. Hall believed that the difficulties could be overcome, but he had indifferent luck in making others agree with him. For three years, approximately, he had to fight the handicaps with little encouragement.

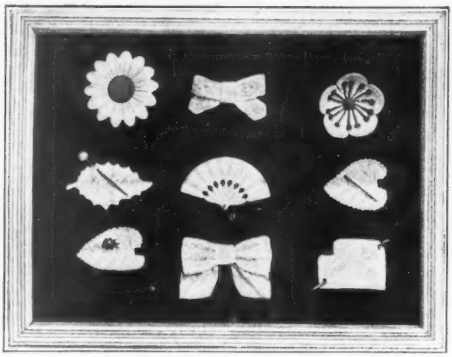
JUDGE TAFT'S SUPPORTING DECISION

Mr. Hall's discovery was made in February, 1886; in July, he applied for a patent on his process; the basic patent was granted in April, 1889. Later, additional patents, perfecting the process, were granted to him. He did not escape the fate of most American inventors, though he kept his patent application in the Patent Office nearly three years; his patents were attacked, and he had to fight them through the courts. In the United States Circuit Court for the Northern District of Ohio his claims were sustained by Judge William H. Taft. In his decision, Judge Taft wrote:

"Hall was a pioneer, and is entitled to the advantages which that fact gives him in the patent laws."

After applying for his basic patent, Mr. Hall set out to secure financial backing. Through his brother, he succeeded in interesting some Boston men. They stuck to him until October, 1886, and then quit because they could not see any profitable future for the process. In Cleveland, Mr. Hall sought the president of one of the biggest chemical manufacturing companies in the country. This man showed a real interest in the process; but from what Mr. Hall has said, his interest was

too strictly financial. At Lockport, N. Y., was an electric smelting concern which was turning out aluminum bronze. Mr. Hall made a deal by which this company agreed to try his process. For a year — from July, 1887, to July, 1888 — the company gave Mr. Hall and his process opportunity to make good. But in that year the process did not take advantage of the opportunity. Mr. Hall by this time thought that he had found out the reason for the failure. He explained to the men at Lockport that if he enlarged the "bath" (which contained the fused mixture through which the electric current passed) and thus moved the poles of his current farther apart, he could probably prevent the "clogging" of the bath with the worthless black precipitate which had appeared. They listened, but were unconvinced; they said good-bye to him and his process.



ALUMINUM JEWELRY

ALMOST THE ONLY USE OF THE METAL FORTY-FIVE YEARS AGO, WHEN IT WAS WORTH $12 A POUND

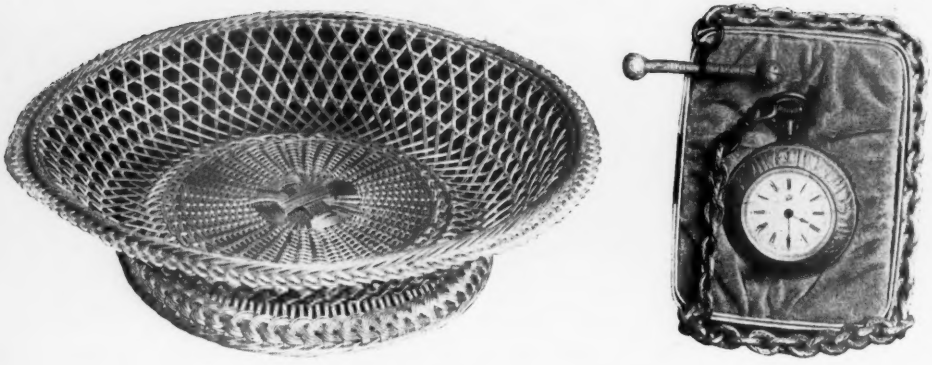
With the help of his brother, Mr. Hall set out to find new backing.

"Let's go to Pittsburg," said the brother. "There's a city that is looking for new ideas." It was true that Pittsburg in 1888 was the nursery of fresh industrial impulses as well as the home of vigorous giants of manufacture. The capitalists of Pittsburg were used to seeing bread that was cast upon the waters of industrial invention come back well buttered.

Within a surprisingly short time after going to Pittsburg, Mr. Hall got the backing he sought. The Pittsburg Reduction Company was formed, and a small plant was secured at Kensington, near that city. By November of 1888 it was turning out fifty pounds a day of

AN ALUMINUM AIRSHIP

THE FRAME OF THE HUGE ZEPPELIN DIRIGIBLE BALLOONS CAN BE MADE OF ALUMINUM BECAUSE THE COST OF THE METAL IS NOW ONLY 18 CENTS A POUND



WHEN ALUMINUM WAS A PRECIOUS METAL

THE LITTLE BASKET, WHICH WEIGHS ONLY FOUR OUNCES, COST $9 WHEN PROF. C. F. CHANDLER, OF COLUMBIA UNIVERSITY, BOUGHT IT IN PARIS FORTY-FIVE YEARS AGO

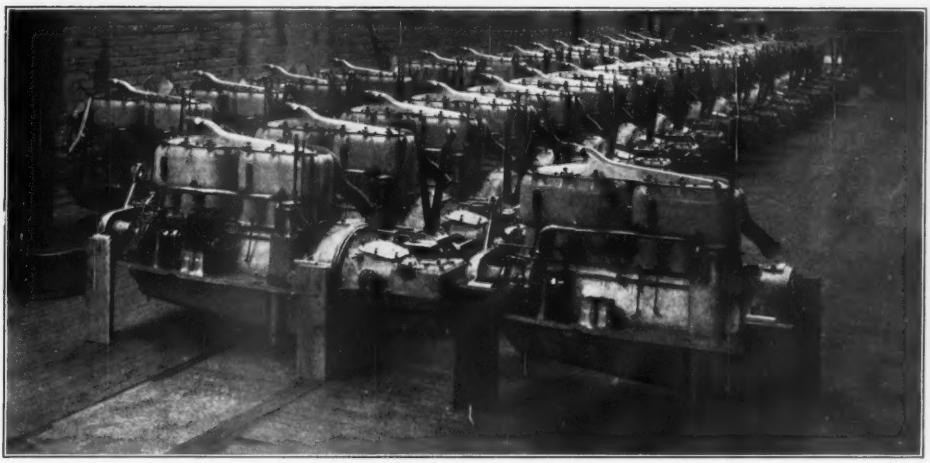
aluminum, and the company was selling it for $2 a pound. In the plant at Kensington, using an enlarged "bath," the old trouble with clogging disappeared — just as Mr. Hall had predicted it would. At the plant at Kensington, too, the inventor made the pleasing discovery which he had predicted, that no external heat was needed to keep the bath fused — the electric current passing through the mixture was sufficient.

Beginning in a factory with fifty available horse-power and with a daily production of fifty pounds, the company grew rapidly. In 1890, Castner, who was using his caustic soda and iron carbide process in England to turn out 500 pounds a day for $4 a pound, retired from the field; Deville had quit two years before.

Twenty-five years covers the history of the Hall process; his company has grown rapidly and steadily, for the bankers in Pittsburg who got behind him never lost faith and furnished the money for more and bigger plants. At the time the Perkin medal was given him, Mr. Hall came from his home at Niagara Falls, where he has lived and worked ever since the Falls were harnessed for the generation of electric power; his company was the first user of that power. At the beginning of 1911, the company's three factories were using 140,000 horse-power of electric current and turning out 40,000,000 pounds of aluminum a year; the price had gone down to 22 cents a pound. Mr. Hall and his associates are the biggest users of electricity among the great electro-chemical works of the world.

A STATUETTE MADE OF ALUMINUM

If this were strictly the story of the discovery and development of the electrolytic process for the manufacture of



NOW THAT ALUMINUM IS PRODUCED CHEAPLY

THE CRANK CASES, TRANSMISSION CASES, AND WATER PIPES OF THESE AUTOMOBILE POWER PLANTS ARE MADE OF THE METAL BECAUSE IT LESSENS DEAD WEIGHT

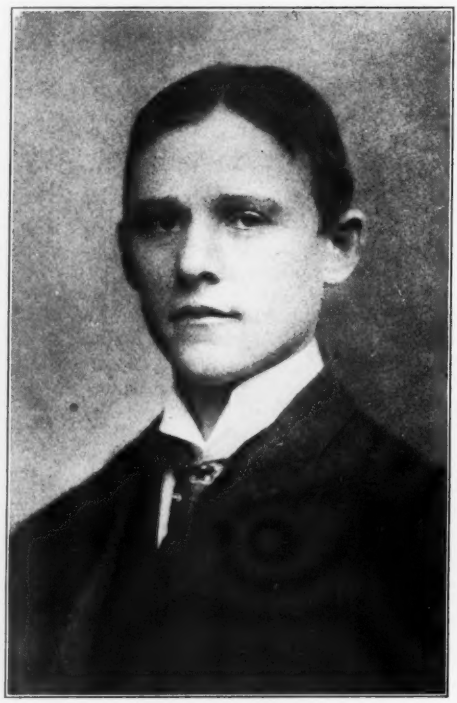
aluminum, the name of a brilliant Frenchman, Paul T. L. Héroult, would be coupled throughout with that of Mr. Hall. In Europe, Mr. Hall is all but unknown, and M. Héroult, who died last May in Paris, was recognized as the discoverer of the

MAKING ALUMINUM CRANK CASES FOR AUTOMOBILES

ONE AUTOMOBILE FACTORY NOW USES MORE ALUMINUM EVERY YEAR THAN THE WHOLE WORLD PRODUCED IN THAT TIME TEN YEARS AGO

process. The case of Hall and Héroult is one of the authentic cases of simultaneous discovery.

Recall that Mr. Hall got his definite results in February, 1886. In April, 1886, M. Héroult attracted the attention of the chemical world by discovering, in France, the identical process. He, too, was a brilliant young worker, for he was born in the same year as Mr. Hall. About the time Mr. Hall's company was getting started at Pittsburg, M. Héroult came to America to take charge of the exploitation of a process with various steel and metal companies. Much of his active career was identified with this country.



MR. CHARLES M. HALL

FROM A PHOTOGRAPH THAT WAS TAKEN ABOUT THE TIME HE INVENTED THE ELECTRICAL PROCESS OF EXTRACTING PURE ALUMINUM FROM CLAY WHICH HAS MADE POSSIBLE THE COMMERCIAL USE OF THE METAL

M. Héroult was present at the meeting of chemists at which Mr. Hall was honored, and he made a little speech. It was different from the sort of speech you would expect to hear on such an occasion from an expert in chemistry. In it he told, with great charm and humor, something about his own discovery of the electrolytic process for aluminum.

He recalled that at the callow age when life seems hardly worth living, when the yearnings of Kipling's soldier in "Mandalay" to be shipped "somewheres East of Suez" strike a young man as an imperative call — that is, about the age of twenty — M. Héroult and his very dear friend and comrade (later his partner in his big manufacturing enterprise) found themselves in the streets of Paris "dead broke." Restlessly, they had pursued pleasure — also, with no regard for cost. Everything pawnable had gone to the money lenders, and the question was where to raise more francs.

"Think, my friend!" urged young Héroult; and after a decent interval the friend produced an inspiration: His aunt owned a souvenir bar of aluminum, six inches long, which had come from the works of Deville. It ought to be very valuable; he would "borrow" it, and no doubt the pawnbroker would advance them a reasonable sum on it. Excellent!

They secured the bar of aluminum and proferred it to the pawnbroker. Without touching it, he asked:

"Is that silver?"

"No," they told him in chorus, "it's better—aluminum!"

"Aluminum—what's that?" asked the pawnbroker, and picked it up. "Why, it's hollow!"

"No, no," objected the two young spendthrifts, "it's aluminum, and it's worth $12 a pound." At that, the pawnbroker weighed the bar in his hand and regarded it long and prayerfully.

"Well," he said finally, "I'll give you 40 cents on it."

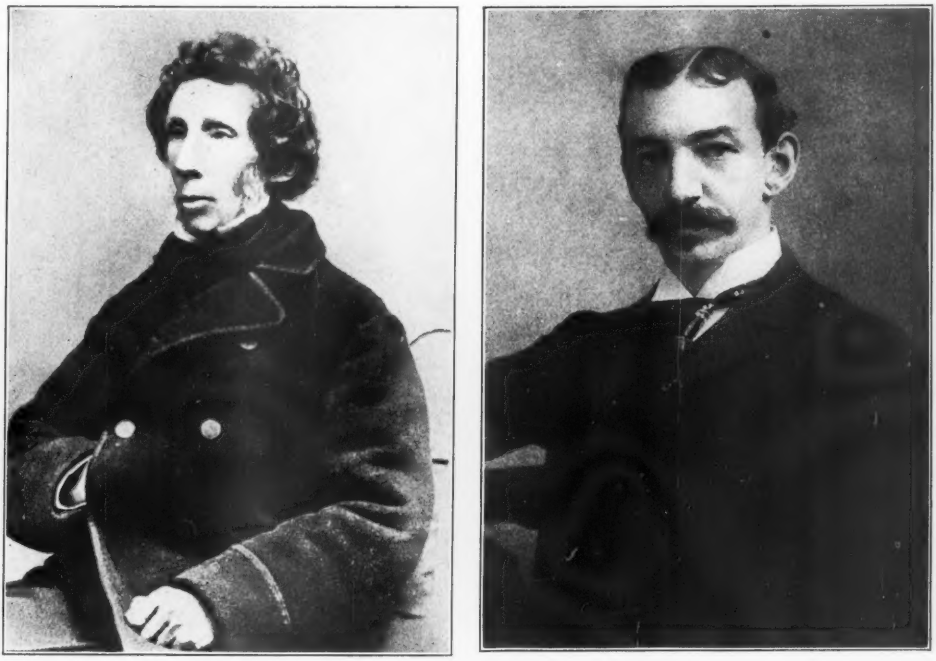
Said M. Héroult to the assembled chemists who listened to his little talk: "On a hot summer day it was better than nothing! We took the money with the firm intention of redeeming the stick, which we never did. Maybe that is one of the reasons why, later on, I had to make good and replace it."

In Europe, M. Héroult certainly did make good with his process. Within three years it was generally adopted over there; and the production of aluminum in Europe has increased even more rapidly

than in this country. In 1911, it had risen to 100,000,000 pounds a year, and its market price had dropped to 20 cents a pound.

M. Héroult concluded his little talk with a prophecy: within ten or fifteen years, he said, aluminum will be used as extensively as copper; perhaps it will have fixed its name upon a new age of metal — as iron named the Iron Age.

and more into the substance of steel; it is replacing copper as a conductor of electricity; it is used to tame refractory oxides and reduce them to carbon-free metals; it is a welding agent as Dr. Hans Goldschmidt employs it in his aluminothermic process. Dr. Goldschmidt now supplies the world with chromium, manganese, cobalt, and alloys of iron with chromium, vanadium, molybdenum, and



PIONEERS IN THE DEVELOPMENT OF ALUMINUM

LEFT: F. WÖHLER, WHO, IN 1827, BY CHEMICAL MEANS FIRST OBTAINED ALUMINUM IN A METALLIC STATE. RIGHT: HAMILTON Y. CASTNER, AN AMERICAN WHO DISCOVERED A COMPARATIVELY CHEAP CHEMICAL METHOD OF PRODUCING ALUMINUM

Away back in the mists of time began the centuries-long Stone Age; then men learned to fashion implements from an alloy of tin and copper, and the bronze age began its long reign; there came the Iron Age to take its toll of the centuries and give its marvelous impetus to civilization — but we begin to suspect that we have about exhausted the possibilities of the Iron Age. We are outgrowing iron — it won't do; for one thing, it won't do for the equipment of our air-craft — and aluminum will do.

As an alloy, aluminum is creeping more

titanium, all carbon free. Into the world's millions of automobiles and thousands of airships, aluminum will enter wherever strength and lightness must be combined; and in the kitchen (no, this isn't an anti-climax!) it is replacing iron and tin.

For America, Charles Martin Hall — a round-headed, modest, quiet, boyish-looking worker — opened the door upon the new age of aluminum. To Europe, Paul Héroult revealed it. There is credit enough in the achievement for both; and until Héroult died they shared it like gallant rivals.

THE STRUGGLE FOR THE CUP

PHOTOGRAPHS OF "RESOLUTE," "VANITIE," AND "DEFIANCE," THAT WERE BUILT TO CONTEND FOR THE POSITION OF DEFENDER, AND OF "SHAMROCK IV," THE CHALLENGER, IN TRIAL RACES AND EXPERIMENTAL RUNS PREPARING FOR THE AMERICA'S CUP RACES OFF SANDY HOOK NEXT MONTH

BY

EDWIN LEVICK

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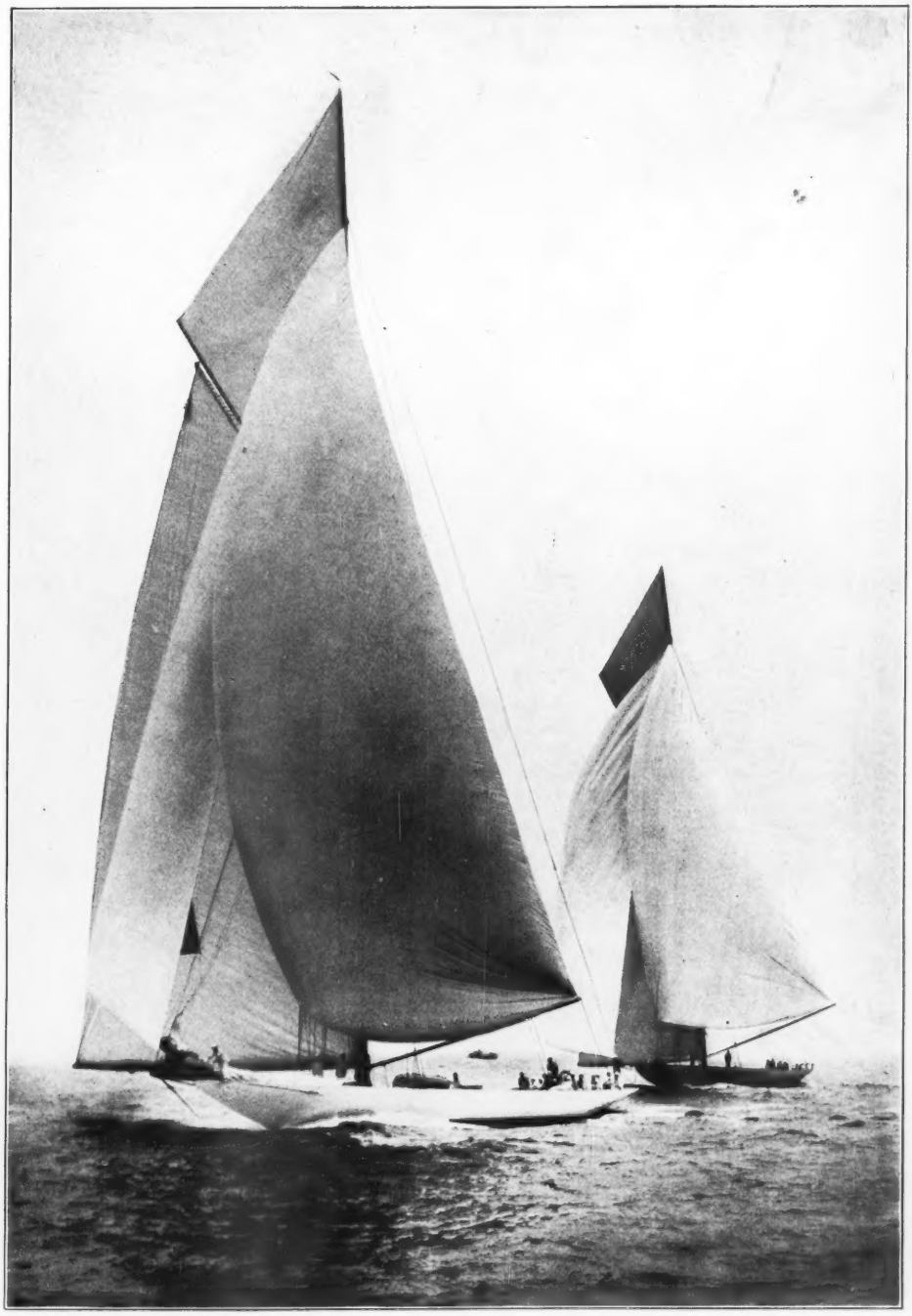
THE START

"RESOLUTE" LEADING "VANITIE" OVER THE STARTING LINE ON THE SECOND DAY OF THE TRIALS IN WHICH THE AMERICAN BOATS RACED TO DETERMINE WHICH SHOULD DEFEND THE CUP



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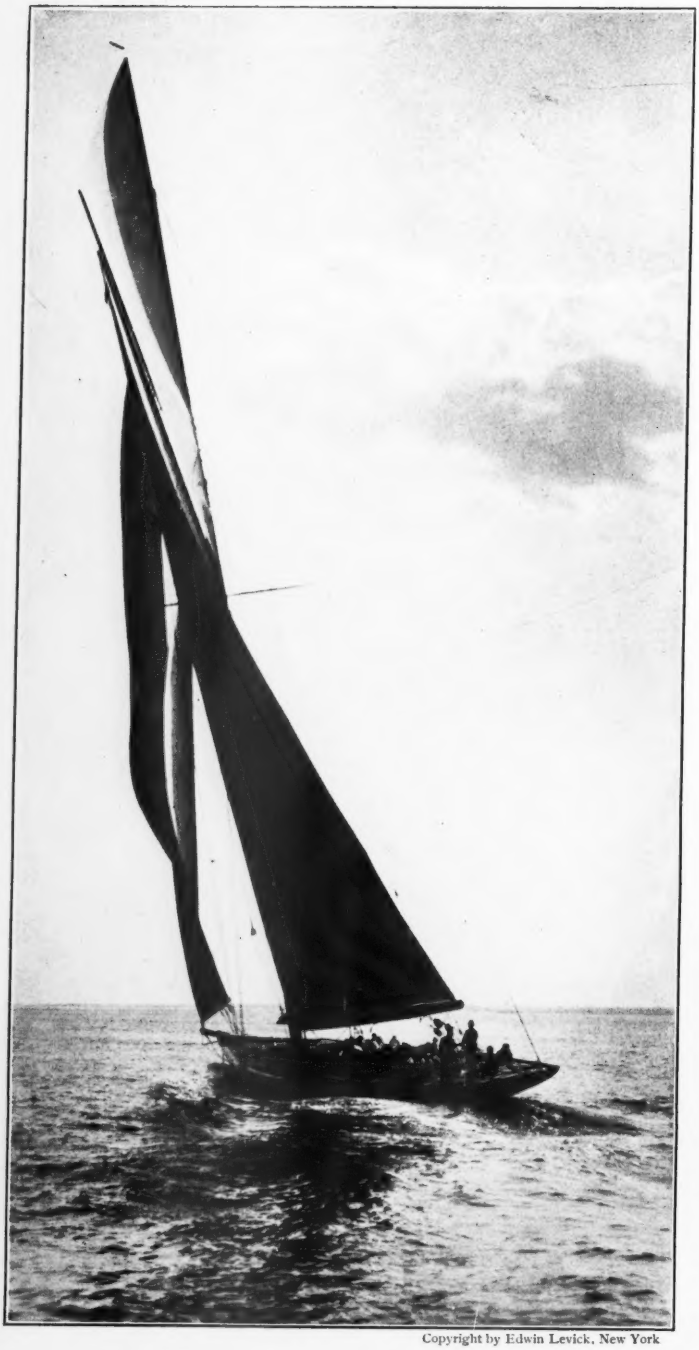
THE FINISH

"RESOLUTE" LEADING "VANITIE" BY SEVERAL SECONDS IN ONE OF THE TRIAL RACES. THE CUP RACES ARE RUN ON THREE DAYS: ON THE FIRST AND THIRD, FIFTEEN MILES TO WINDWARD OR LEEWARD AND RETURN; ON THE SECOND OVER A 30-MILE TRIANGULAR COURSE



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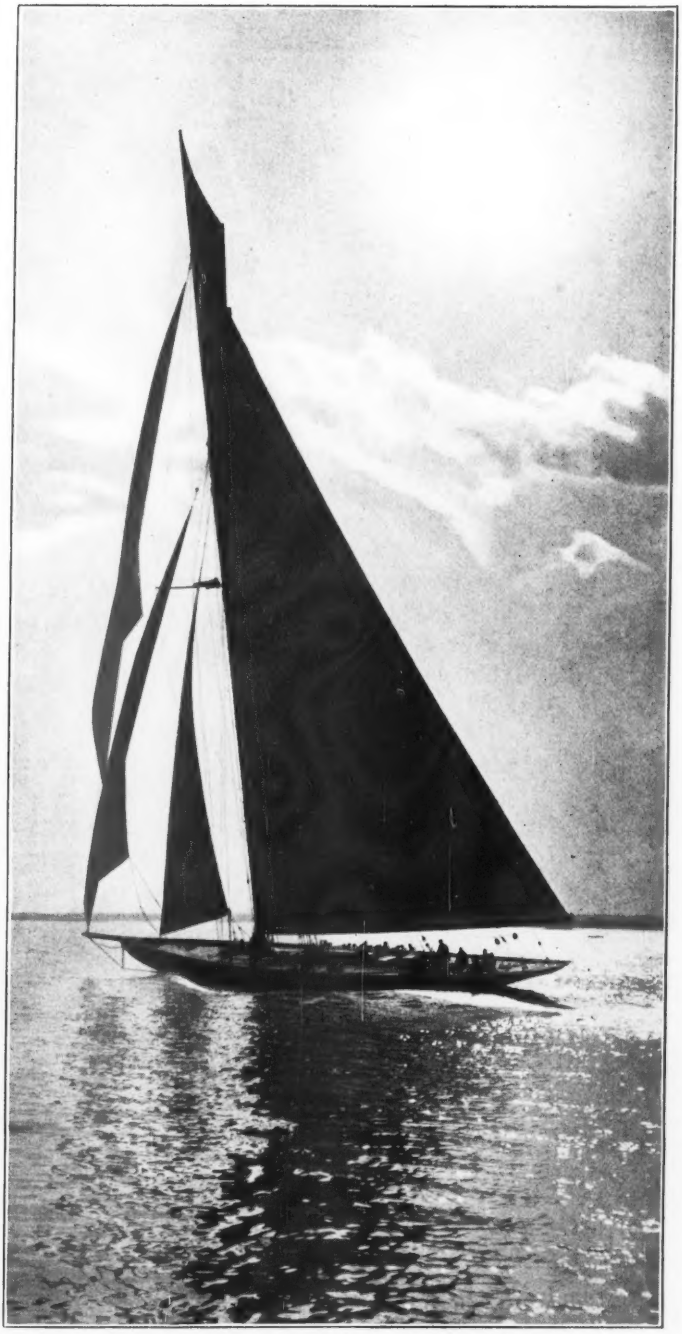
"RESOLUTE"

Each of the American yachts is 74 feet, 9 inches long at the water line and 13 feet, 9 inches in draft, but they vary a good deal in length over all, in sail area, and in other dimensions. The rules of the Cup Race permit any length from 65 to 90 feet, but the Americans have practically met Sir Thomas Lipton's request to race 75-foot boats

"VANITIE"

Yachts are "rated" (that is reduced to uniform standards of comparison) by a complicated mathematical calculation of their dimensions, and yachts of high rating must grant yachts of lower rating a "time allowance" that corresponds to the handicap that is allowed in a horse race to the horse that carries the greater weight.



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"SHAMROCK IV"

With which Sir Thomas Lipton will try for the fourth time to capture the America's Cup. *Shamrock IV* was designed by Mr. Charles E. Nicholson and was built at Gosport, England. This is the thirteenth English yacht to try (all unsuccessfully) for the cup since 1851

Photographs copyrighted by Edwin Levick, New York

ON THE DECK OF "RESOLUTE"

WHICH IS OWNED BY A SYNDICATE OF MEMBERS OF THE NEW YORK YACHT CLUB, HEADED BY MR. CORNELIUS VANDERBILT. "RESOLUTE" WAS DESIGNED BY MR. NATHANIEL G. HERRESHOFF

"DEFIANCE"

It carries more sail than either of the other American contestants. *Defiance* was designed by Mr. George Owen and was built for a syndicate that is headed by Mr. George M. Pynchon, of New York, and Mr. E. Walter Clark, of Philadelphia

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ON THE DECK OF "VANITIE"

WHICH IS OWNED BY MR. ALEXANDER S. COCHRAN, OF NEW YORK, AND WAS DESIGNED BY MR. WILLIAM GARDNER
IT IS LONGER OVER ALL THAN "RESOLUTE" OR "DEFIANCE"

PRACTICAL WORK IN FARMING
FOR BOYS AND YOUNG MEN WHO ALTERNATE WORK IN THE COTTON MILLS AND IN THE SCHOOL

A WHOLE-HEARTED HALF-TIME SCHOOL

AND THE REV. J. A. BALDWIN, OF CHARLOTTE, N. C., A MISSIONARY TO A MILLION FORGOTTEN AMERICANS, WHO DIRECTS IT—YOUNG MEN AND WOMEN WHO ARE GETTING AN EDUCATION IN BOOKS AND IN THE PRACTICAL ARTS OF LIVING WHILE THEY EARN THEIR WAY IN THE WORLD

BY

WALTER A. DYER

THIS is the story of a remarkable man, the Rev. J. A. Baldwin, of North Carolina; of a unique school which he founded and is now conducting; and of the events through which his work became merged with that of another remarkable man, Mr. Charles R. Towson, of New York. But first I must tell something of a million white Americans whose dire need called forth the efforts which produced the events in this history.

Slavery hampered the old school system in the South. The War and Reconstruction all but disrupted it. The result was that the generation which grew up in the South after the War was an uneducated generation. The census of 1910 showed that in North Carolina alone there were 122,189 grown white people who could neither read nor write. In the whole South there are probably a million of these people that the schools have neglected. The mill towns that sprang up all over the Carolinas and in Georgia and Alabama provided rather better schools than the surrounding country. The mill village children probably attended school as much as did the country children, but the children who worked in the mills and who thereby lacked sufficient schooling were more noticeable than the youngsters who were growing up in ignorance on

the farms. The mills, therefore, can be credited with providing some schooling, but their practice of working girls and boys of school age seemed to stand in the way of further progress.

Even worse than their illiteracy was the resulting incompetence of these people. They were denied the advantage of any sort of vocational training. "The cost of white illiteracy to the South," said Dr. G. W. Dyer, of Vanderbilt University, "is enormous, because it shuts out from a more productive life a great army of workers who are capable of the highest efficiency in production, who have every essential characteristic of industrial efficiency save the technique of education."

REV. J. A. BALDWIN

WHOSE INSPIRING WORK TO LIFT "THE FORGOTTEN MEN OF THE SOUTH" OFFERS A NEW HOPE TO A MILLION AMERICANS

To meet this need there arose in the South its great intellectual leaders — Curry, Alderman, McIver, Hill, Aycock, and Claxton. These men saw with prophetic vision that the South's rebuilding depended upon the fitness of the masses — "the forgotten men of the South" — to take an active part in it. During the '80's and '90's these men fought for public, democratic education — and they won their fight. The end is not yet; the South needs better schools and better teachers and laws for compulsory education; but there is no longer any question of that need, and the South is providing for its own. It is probably making progress in education faster than any other part of the country.

As this educational movement was getting started there came an industrial awakening of the New South which has been both a help and a hindrance to the educational movement.

A young Methodist clergyman during these days saw all this, saw the need of forgotten whites of the Piedmont-Carolina section of the South. Half a million of these had gone to work in the eight hundred cotton mills, and another half million was in other factories and on the farms. The cry of these million souls sounded in his ears, and the words of Carlyle, "That there should one man die ignorant who had capacity for knowledge, this I call a tragedy!"

J. A. Baldwin was reared on a farm in Richmond County. He borrowed money with which to go to college, and he taught school for four years after his graduation to pay it back. It was then his purpose to enter a theological seminary and become a foreign missionary, but the illness of a sister prevented, and while he was waiting for her to recover he took the pastorate of a small mission church in a mill district at Charlotte, N. C.

This was in 1898. Conditions in the mill district were distressing. The mill was running night and day and children were working. Pastoral work was difficult and ineffectual because the people moved so often. One removal a year was a fair average for a mill family; one man whom the pastor knew moved thirteen times in one year. The people were very religious but unstable, and though Mr. Baldwin believed thoroughly in the value and helpfulness of evangelistic revivals, of which they were very fond, he was convinced that these were not sufficient, and that it was very important that they have some intellectual training.

In coöperation with Mr. D. A. Tompkins, of the Atherton Mill at Charlotte, Mr. Baldwin attempted welfare work on a small scale. He began the work of getting the mill people to make gardens, and the

TEACHING THE GIRLS

FIELD WORK AT THE SOUTHERN INDUSTRIAL INSTITUTE

AN INCALCULABLY VALUABLE TRAINING FOR BOYS WHOSE FOREFATHERS FOR GENERATIONS DRAINED THE VITALITY OF THE SOIL AND GOT ONLY POOR CROPS BY INEFFICIENT METHODS OF CULTIVATION

offering of prizes. The improvement this made in their condition was encouraging, but the deeper needs of the people so worked upon him that he abandoned his plan to become a foreign missionary, and at the close of his pastorate he asked for another charge in a mill community. He was sent to Gastonia, N. C., a typical mill town.

Meanwhile conditions had been improving; the statewide educational programme was being put into operation and reforms were going on among the mills. There was to be a chance for the children of "the forgotten men" to go to school. But the change had come too late for thousands of young

HOUSEWIFERY

men and women who had had no opportunities and were likely to have none — not only in the mills but on the farms, for Mr. Baldwin had found his field in the entire million of forgotten whites of the Piedmont-Carolina region. The case of these young people completely absorbed his interest.

While he was at Gastonia, Mr. Baldwin's idea of a school for forgotten whites became crystallized in his mind — a nonsectarian boarding school in which a general education should be combined with a textile course for the mill boys, an agricultural course for the farm boys, and sewing, cooking, and music for the girls. The expenses of such a school

A LESSON IN DEEP PLOWING

AFTER PLOWING WITH TWO, AND SOMETIMES FOUR, BIG MULES THE BOYS WILL NOT BE CONTENT TO GO BACK HOME AND SCRATCH THE SOIL WITH A SMALL PLOW AND ONE "PLUG" MULE

GARDEN TRUCK THAT HELPS PAY FOR SCHOOLING

THE SOUTHERN INDUSTRIAL INSTITUTE IS ONLY THREE MILES FROM CHARLOTTE, N. C., WHERE 40,000 PEOPLE ARE A READY MARKET FOR THE FARM PRODUCTS THAT ARE RAISED BY ITS STUDENTS

must be low, and means must be provided for the students to earn their way, the girls doing the housework and the boys raising their own provisions or working part time in the mills.

With this idea in mind he visited Booker T. Washington's school for Negroes. There he found the blacks receiving very much the sort of training he wished to give. He secured promises of aid from several influential friends, particularly Mr. E. A. Smith, then president of the Chadwick Mill, at Charlotte. Mr. Baldwin completed his plans of organization and went north to study industrial and technical schools for a few months.

Returning to Charlotte in the spring of 1902, he got a site for the school — the money for the land was secured partly by loans and partly by contributions — a farm of 278½ acres near the Chadwick Mill, about three and a half miles from the centre of Charlotte.

The school was named the Piedmont

MORNING EXERCISE AT THE INSTITUTE

PROBABLY FEW SCHOOLS GIVE SO COMPLETELY ROUNDED A LIFE TO THEIR STUDENTS AS THIS SCHOOL FOR YOUNG MEN AND WOMEN OF THE PIEDMONT-CAROLINA REGION WHO HAVE TO WORK IN THE FIELDS AND MILLS TO EARN THE LEISURE FOR STUDY IN BOOKS

Industrial School and was chartered by the legislature as a stock company. Then came the task of raising money for a 16-room frame building. Mr. Baldwin made an unsuccessful tour of several towns in the state, seeking funds. He was so unsuccessful that at Durham his money gave out. But before he left he received in his mail a check for $10 from a friend. From that time on the money came in. He took new courage, and in a few weeks he had raised the necessary amount.

The building was completed two days before Christmas, 1903, and on January 1, 1904, the school was opened with eleven students. They had no desks, but held classes in the dining room.

Mr. Baldwin saw three alternatives before these young people whom he wanted to help: either they remained in ignorance away from school, or somebody paid their school bills, or they got an opportunity to work their way through. The total expense for each pupil was about $150 a year. But this would be prohibitive for those who needed the training most, so the price was made $100, and the other $50, in the absence of an endowment, was solicited from friends.

The $100 must be paid by the student either in cash or work. In many cases the $100 charged in cash would as effectually shut the door of opportunity as though it were ten times as much. The students are put to work on a strictly business basis. An account is kept of the number of hours each student works, and the rate per hour is determined by the efficiency of the work. In this way every possible incentive is given for faithful and efficient labor. This plan greatly increases the work of the bookkeeper, but that is a small matter compared with its advantages. It was Mr. Baldwin's idea that remunerative work on the farm and in a cotton mill done by students working half time would be nearly or quite sufficient to pay their necessary expenses in school. It seemed easy to believe that farm work could be done so, but most people shook their heads or laughed outright when he spoke of running a mill that way.

But in the meantime the Hoskins Cotton Mill was built near the school, and an opportunity was given for testing the scheme in a small way. At various times from four to twelve students have thus been at work in pairs. The half-day-about and the week-about plans have both been used in these tests.

WEEK-ABOUT WORK AND STUDY

Each plan has its advantages and its disadvantages, but experience seems to favor the former for children and the latter for grown young people. The important thing is that the plan works. Mill work is more difficult in this, that greater care must be taken in pairing off the student-workers, as they must run the same machines. Then, too, the machinery is costly and must be run continuously, so if one student drops out for any reason his place must be filled promptly. On the other hand, the remuneration is considerably greater in the mill than on the farm. A fairly good worker on the farm can make during the two weeks of the month from $10 to $14 without board, and in the mill one can make from $16 to $20.

Perhaps no man in America has given so much time and thought to the problems of part-time work as Mr. Baldwin has. He has felt that the working out of practicable methods by which young people might be enabled to help themselves, and the creation of a sympathetic and intelligent public sentiment, are much more important than the building up of a school and the sending out of young people trained in head, hand, and heart, deeply as he feels the need of that. He believes that part-time work is just in its beginnings, and that there are untold possibilities of usefulness in it. He would prefer that the law should permit children from 12 to 16 years to go to school half a day and work half a day rather than that the law should keep children out of the mill altogether until they are 14, and then permit them to work all the time. He has been steadily seeking a remedy for the evils of continuous labor on automatic machinery which requires almost no thinking or planning on the part of the operative after the process has once been learned, and as a result of his experience he recently

suggested the following scheme, which he believes may be profitably adopted by a good many mills:

A PLAN FOR PART-TIME LABOR

Instead of working ten hours a day as at present, have two sets of operatives, each working eight hours, one to begin at 4 o'clock in the morning and work till noon; the other to work from noon till 8 o'clock in the evening. This would give each set a full night's sleep and a full half day outside. During this half day they might work small truck farms, run a coöperative dairy, raise hogs, cattle, and chickens, etc., thus giving to them a variety of work, the encouragement of having a work of their own, and the mental development that would come from the thought and planning necessary to make it a success. Though this plan would be impracticable in a large city it is not inherently impossible in the South, for many mills are surrounded by plenty of available land that is suitable for these purposes, and most of the mill workers have been away from the farm only a few years.

For more than a generation half-time work has existed in England. There it has been developed for children between the ages of 10 and 13, an age at which in most states we keep children out of the mill altogether. Though the arrangements for them in English schools have not been very satisfactory, the system at least gives good reason to believe that under more favorable conditions highly gratifying results would be obtained.

During the last ten years a great many part-time plans have been attempted in various parts of this country. Perhaps none has been more successful than the Textile Industrial Institute in Spartanburg, S. C. The founder, Rev. D. E. Camak, had a vision not unlike that of Mr. Baldwin, in whose school he spent the year 1910, returning to Spartanburg to establish a school of his own. He has been fortunate in locating near a small mill, the managers of which have welcomed his plan and are coöperating with him in the work. All his students — he has about fifty — work on the week-about plan, and his success is now well assured.

In Mr. Baldwin's school the work has been varied — teaching the ordinary English branches, emphasizing the dignity of labor, holding up high ideals of character and service, working out in a small way and often under discouraging conditions social, educational, and industrial problems of far-reaching importance. Gradually people came to have more and more faith in his plan, and from time to time some strong man entered into coöperation with the school. This was particularly true of Mr. Arthur J. Draper, who became largely interested in the Chadwick-Hoskins Company. Since 1906 Mr. Draper has been the strongest friend and supporter of the Institute.

But the work done seemed insignificant in proportion to that which needed to be done. More money was required, more buildings, a plan to reach in some more effective way the hundreds of mill communities in the South. Mr. Baldwin is a deeply religious man — he prayed.

ENTER THE Y. M. C. A.

Now enter the second leading actor in this drama — directed, if you will, by Providence.

Six hundred miles from Charlotte, in New York — Mr. Charles R. Towson, head of the Industrial Department of the Young Men's Christian Association for the North American continent, was devoting his remarkable talents to the task of bringing the well known advantages of the Y. M. C. A. to thousands of men and boys in mills and shops, lumber camps, mines, and railroads all over the country. Inevitably his attention was drawn to the cotton mills and "the forgotten men of the South."

Y. M. C. A. work in the South was no new thing. It was active a decade before the Civil War. But the great cotton mill industry, with its two billion dollars of investment and its thousands of operatives, had been largely overlooked. The first Y. M. C. A. in a cotton mill community was started at the Monaghan Mills, Greenville, S. C., in 1904.

This was looked upon as an experiment at first, but Mr. Towson believed in it. It has succeeded, and now in a dozen

large mill centres in the Carolinas the Association is serving industrial workers.

But the Y. M. C. A. workers have been for the most part Northern men, who could not hope to accomplish as much in this field as Southerners. Mr. Towson felt the need of some sort of training school that would fit Southern men — among others representatives of the "forgotten" class, for there are certain fields where they can be particularly effective — for this work. While on a trip through the South in 1907 he visited the Piedmont Industrial School. Here he discovered students eager to find some field for home missionary work among their people. For Mr. Baldwin had not sought to restrain their ambitions, but to direct the energies of each according to his natural bent and talents. Many of them were religious by nature and desired to become ministers or to take up some form of social service work. So Mr. Towson proposed to Mr. Baldwin that they combine forces and continue the school under the auspices of the Y. M. C. A.

The idea appealed to Mr. Baldwin. The Y. M. C. A. was non-sectarian, and an alliance with it offered wider opportunities for service. He was interested in general welfare work among the mills and had ceased to be content with his restricted local field. He still saw the need of the "forgotten million". Moreover, financial coöperation was offered, which he sorely needed.

A FOURFOLD PURPOSE

The facts were laid before the directors and stockholders of the school, and they accepted the plan. In January, 1908, the property was transferred to the International Committee of the Y. M. C. A., and the name of the school was changed to the Southern Industrial Institute. Mr. Baldwin was continued as its president and was also made an executive secretary of the Y. M. C. A. for the Southern industrial work.

The present purpose of the school is fourfold: first, to furnish elementary education and something of culture to young men and women who may lack financial resources and previous education, and, by means of a part-time system, to make it possible for students to earn their education as they progress. Second, to furnish practical training in the cotton mill business, agriculture, and home making. Third, to make the Institute a centre for welfare work among the mill communities of the Piedmont-Carolina district. Fourth, to discover and train leaders for the industrial Y. M. C. A. work of the South.

To-day the school is an industrial colony in which the students prepare for life by practising it — the boys alternately in classes and in the mills or on the farm, the girls alternately in classes and in the mills or in the kitchens or laundry of the school. In the mills and on the farm, with its 175 acres of truck garden and small grain and corn fields, the students are getting a very practical education, for they are shown the proper way to work. In their classes they receive sufficient book education to prepare them for college if they wish to go (six or eight do go every year); but the courses of all the students are not limited to the special subjects which prepare for college.

HOW THE INSTITUTE HAS SUCCEEDED

In addition to its regular enrolment of boarding pupils, the Institute had charge of the public grammar school in the Hoskins Mill Village until last year. This arrangement was made in 1905, when there were fifty pupils in a small building. Last year a special tax was levied and a new building erected, and the attendance has increased year by year until it now ranges from 200 to 300 pupils. The community had grown so that everybody concerned felt that it would be better for both the Institute and the community if the public school were managed separately. The friends of the Institute are justly proud that not a single vote was cast against the special tax. Scarcely could a more eloquent tribute be paid to the influence of the Institute in its own community, for usually the greater the poverty and ignorance, the more bitterly the people oppose a special tax for schools.

To what extent has the Institute thus far accomplished its purpose? About five hundred boarding students have

taken more or less complete courses in the school, and it has been of service in more limited degree to as many day pupils. These students who have gone forth to fields of useful service are the justification of the Institute's existence.

STORIES OF THE STUDENTS

For example, a few years ago a lad came to the school to take a term's work in arithmetic; he needed a working knowledge of fractions to help him in the mill. He became interested in getting an education and remained four years, working his way through. Gradually his vision broadened and he went on to a medical college, still working his way, except for some help from a brother-in-law. He will graduate this spring. Already an excellent position has been offered him, but he will probably decline it and go north for further study.

Another boy, who had had very little schooling, came to study arithmetic and remained at the school for two years. He returned to the mill and is now an overseer, making three or four times as much money as before. These two boys are illustrative of two broad types — those who go back to do better work at farm or mill, and those who graduate from the mills into other callings.

The achievement of the school's purpose as a community betterment centre is illustrated by the obvious improvement in conditions in the Chadwick-Hoskins mill village. Evidences are manifest of increasing prosperity and comfort, and of a growing taste for the beautiful. In this community of more than 1,500 people not a single police officer is needed, and the mill managers attribute to the influence of the Institute much of the high character of the community.

An indication of this popular spirit is the home gardens of the mill people, which have been encouraged by prizes presented by the mill managers. Of 120 families in the village, about 100 had vegetable gardens last year. Two or three years ago, a Government expert estimated the value of the products of the village gardens at $6,000 to $8,000. Flower gardening, too, has become popular. The roses of the village have become locally famous, and last fall the finest chrysanthemums that were grown in Charlotte were to be found in the yards of cotton mill operatives.

A POWERFUL FORCE FOR CIVILIZATION

In its capacity as headquarters for the Industrial Department of the Y. M. C. A. in the South, the Institute is much more than a local school. It is exerting a wide and powerful influence throughout the Piedmont-Carolina region as a welfare centre. The multiplication of Young Men's Christian Associations in the industrial South makes possible a large use of the experience, methods, publications, and workers of the Institute. Expert lecturers and teachers are sent out to other mill communities to discuss problems of personal and community health, education, and morals. Seventy-two mill villages were served in this way by the Institute last year.

This extension work for social service includes the promotion of vegetable and flower gardens in mill communities; popular stereopticon lectures on a variety of instructive subjects; night classes; the promotion of better hygienic conditions; and the introduction of practical, simple vocational training in small public schools in rural and mill communities.

Finally, the Institute is beginning to train Y. M. C. A. secretaries and directors and leaders for general welfare work throughout the industrial South. The demand for such leaders at present greatly exceeds the supply.

The Southern Industrial Institute is more than a school, more than a Y. M. C. A. headquarters. It is a force in the development of American democracy in the South.

TRADING PROFITS FOR BRAINS

THE UNITED STATES RUBBER COMPANY'S PRACTICE OF SHARING PROFITS WITH ITS EXECUTIVES TO BUILD UP A BUSINESS PATRIOTISM AMONG THE CONSTRUCTIVE THINKERS OF ITS VAST BUSINESS

BY

FREDERICK TODD

[*In the belief that among the various forms of profit sharing which are being tried in this country lies the tie that will bind employers and employees together, and thereby lessen the losses of labor conflicts and increase the efficiency of labor and management alike, the* WORLD'S WORK *will print descriptions of several of the profit sharing plans that are now in operation.* — THE EDITORS.]

"YOU can't buy the efficient loyalty of your employees with money," said a manufacturer who has a thousand men working for him, recently, when talking about different schemes of profit sharing. "When I see a man in my force who can help me run my business better, I make a friend of him. I find ways of letting him know that I'll throw everything his way that I can, leaving something for myself. But I have never thought much of this finessing with the whole payroll."

Very much in character with the same idea is the system of profit sharing which the United States Rubber Company has been trying for two years with much satisfaction to its executives. Of the 55,842 employees, the company offers the benefit of its system to about 1,200. It does not give them something for nothing. In the order of their ability, as measured by their salaries, all employees who make twenty-five dollars a week or more, excepting the chief executives, are invited to purchase the company's common stock on the following terms: the employee subscribes to a number of shares which can be purchased for from 10 to 20 per cent. of his salary. It is 10 per cent. in the case of $25 a week men; it is 20 per cent. with men who get $10,000 a year. Between the two the percentage grades up. The employee agrees to pay for the stock within a year, having regular instalments taken from his salary.

Immediately he subscribes, he receives from the company a check, which just about pays for half the cost of the stock he has subscribed for. Afterward, during five years, if the employee remains with the company, he receives enough, in regular dividends on the stock and in special profit sharing dividends of $3 a share, to reimburse him for all he paid out and a little more.

Without giving them the stock, the company helps certain of its employees to get it for a comparatively small initial outlay which they get back in a short time. Because this is stock upon which it pays regular dividends anyway, it is enabled to "throw something their way" at only part cost to itself. The whole scheme is evidently one to make friends of the employees who can help make the company's business run better.

But that only half tells the story. There is a bigger idea behind the rubber company's profit sharing system than merely getting a little better work from its men by "finessing with the payroll."

Men who are criticising the economics of "big business," like Mr. Redfield, Secretary of Commerce, Mr. Brandeis, Mr. Douglass, of St. Louis, and others, have begun to emphasize the difficulties in the management of great incorporated industries. They have said that mere bigness does not bring the economies that have been claimed for industrial consolidation. On the contrary, they assert that bigness reaches a limit of efficiency, beyond which

efficiency declines because very few executives have learned how to direct large armies of employees so as to get the most out of them. Some have gone so far as to say that criticism of labor, to-day, because of what is described as its disposition to do less and less work, might better take some notice of inefficient management.

The profit sharing system of the "Rubber Trust" is designed in part to meet this difficulty. It is devised to organize the efficiency of a managerial class of employees working under the command of the chief general executives of a big, highly diversified, and scattered industry, and directing the mass of routine workers and labor below it.

The rubber company's business offers unusual executive difficulties, because its activities are so various and so scattered. It makes and offers for sale such a range of different articles, made from one crude material, chiefly, that every man, woman, and child uses daily something which could be bought of it. It has 43 factories scattered over the eastern part of the United States and on the southern border of Canada. It grows rubber and gathers rubber and buys it in local markets all around the world's tropical belt. There are 12,000 natives and others cultivating its 40,000-acre plantation in Sumatra.

Then, when it gets the crude rubber to America, it sells some to rivals and refines and tempers the rest for its own use. Rubber is just rubber, of course, but it can be treated in ways that result in its coming out in several distinct "raw materials" for various kinds of manufactures. "Wild" rubber and plantation rubber also are different in constituency and texture. They are used separately for different kinds of articles and mixed for still others.

A VERY VARIOUS INDUSTRY

Going from one of the company's factories to another is really going from one industry to another, so radically different are the mechanical equipments, the goods manufactured, and the kinds of people at work. The 43,842 employees in America are men, women, boys, and girls of every type and nationality that works in American factories. The various occupations in the rubber industry require different grades of intelligence, physical strength, and special fitness. Probably no other one corporation has such a wide variety in its manufacturing industry.

Added to its manufacturing the company has an extensive sales organization. Some of the products — automobile tires, fountain pens, hot water bottles, rubber boots, mackintoshes, etc.— are for such entirely different lines of trade that the company must have distinct selling forces for them.

This whole industry is managed generally as one. The rubber supply goes to all. The financial arrangements for all are made together. Advertising is handled generally. For the departments of the business, a corps of men are always at work designing new articles and new styles.

A PLAN FOR EXECUTIVES ONLY

The gentleman who is at the head of the rubber company has an executive task something like that of the commander-in-chief of the Nation's military forces. The main office of the company is his capital. His brigades and naval squadrons are scattered over much territory. He has his military cabinet and many special officers near him. He directs the general campaign. The battles are fought at far distance. Between him and the firing line are a succession of major and minor officers. From the lieutenant-general down to the sergeants every man of them has his responsibility in the direction of the forces. There are differences in the bravery and intelligence and in the physical fitness of the private soldiers, but very little account is usually taken of that. The results of campaigns depend on the ability and the organization of the officers. The commander-in-chief knows much that is going on. In his general direction, he may require full information about an engagement in which a single company of men were employed. He may visit in person the camps of his forces. He may not only know the science of war, but the soldier's tactics. Still, the success of his campaign will not depend on these small attentions to detail. It will depend upon the intelligence he has used in organizing his officers, from top to bottom.

It is these various officers, from corporal up, in its widely scattered organization, that the rubber company is reaching with its plan. If you should take the working forces of the United States Rubber Company and make a grand division at the $25 a week line of salary, you would find that you had automatically made a very clean cut between those whose work is either wholly manual labor or routine mental activity requiring little initiative and those who do the thinking that keeps the industry going. The latter are what one of the officers of the company calls "the real producers." To the degree of his ability, every man in this upper class of employees is a manager and on his initiative and management depends some big or little part of the prosperity of the corporation as a whole.

HOW THE PLAN WORKS

For the last three years, every one of these "real producers" has received a letter in April inviting him to purchase a certain number of shares of the common stock of the company. The letter has been mailed to him at his home and has come from the president's office. The letter has explained the bonus and special dividends that the company will pay to employees who buy the stock, and the terms on which he can pay by instalments. This year, the stock was offered to employees at $60 a share.

If the employee is earning $25 a week, he was this year invited to buy two shares. The $120 which they cost is roughly 10 per cent. of his yearly salary. He arranged to pay for them by having regular monthly instalments in even amounts of not less than $6 deducted from his pay envelope. Immediately upon his subscription and the allotment of the stock to him, he received from the New York office of the company a check for $39, representing a bonus of 3 per cent. of his previous year's salary. During the year, and for the next four years, if he remains in the company's employ he will have credited to him special "profit-sharing" dividends of $3 a share. He will receive, from the time of subscription till he parts with his stock, the dividends regularly declared on the stock, now $6 a share. All these payments, so far as he can apply them to the $120 that he must pay in full within the year, he considered in making his arrangements for the instalments. This was all left freely to his judgment. He could use his $39 bonus check for whatever he might want and make his instalments bigger. Or he could endorse it right back to the company and fix his monthly payments accordingly. He is charged 5 per cent. interest on any amount he owes the company.

Just as soon as this year's payments on the $120 are completed, the stock will be turned over to him in fee simple.

It figures out that all the money that must be deducted from his own salary is $63, because the $39 bonus, the $12 of regular dividends on Rubber common stock, and the $6 in special employees' dividends will total $57 which the company will pay. And during 1915, 1916, 1917, and 1918 he will get back $18 a year in regular and special dividends, or $72 in cash. Altogether, for the $63 that he is to pay in instalments during 1914 he will receive the two shares of stock that is now paying regular dividends of $6 a share and $129 in cash from the company. It makes a pretty good investment of his money. And it really costs the company only $69 on the five years, inasmuch as the regular dividends on the stock it sells to the employee would have to be paid to some other holder if the employee did not receive them.

AN EASY ROAD TO INDEPENDENCE

Looking at it from the employees' point of view, it is an easy way to become a stockholder in the company, as the years go on. If it could be probable that the market price of the stock (which determines the price at which it is offered every year to employees) would remain the same for twenty-five years, and the dividends not become larger or smaller, the $25-a-week-man would find his income from regular and special dividends growing larger so rapidly that after four years he could more than pay for his stock, as he took it, with his surplus dividends. He could retire after twenty-five years, without having invested a cent of his regular

earnings. This is conjectural, of course, because market quotations and dividends are probably going to change.

But an employee with anything in him will not stop at his $25-a-week job. He will do his best to get into higher grades. The stock that the company helps him to every year amounts in value to about 10 per cent. of his salary. If he can get on so as to earn only a few hundred dollars a year more, he will get 11, 12, and higher percentages of the bigger salary in what, in the long run, amounts to free stock, as he advances in the company.

Now the $5,000 a year man: the company finances him to the ownership of fourteen shares of stock but does it in a little different way from that designed for men in lower grades. He is invited to take stock valued at about 16 per cent. of his salary, and the company presents him with a bonus of 5 per cent.

But he gets only three fifths of the bonus at once in cash. The other two fifths he receives in the form of a certificate entitling him to stock which will be delivered at the end of five years if he stays an employee. He will receive all regular dividends on this bonus stock in the meantime. All men earning $5,000 or more get this kind of bonus, three fifths cash and two fifths stock. That is, the division is made as nearly in that proportion as can be done without having any fractional shares. With a $5,000 a year man, who is expected to take enough stock to cost 16 per cent. of his salary, or $800, and the cash value of whose 5 per cent. bonus is $250, it works out that he subscribes for thirteen shares this year, and as two fifths of his bonus, $100, won't buy two shares, he actually receives $190 in cash and a certificate entitling him to only one share of the bonus stock.

THE $10,000 A YEAR MAN

A $10,000 a year man subscribes for 33 shares, which is roughly 20 per cent. of his salary. The money value of his bonus is $800, or 8 per cent. of his salary. This divides so as to bring him $500 in cash at once and a certificate for five shares of bonus stock, delivery deferred, but bringing him dividends regularly. From $10,000 to $17,000, the upper limit of the system, everybody shares numerically alike, with 33 shares to subscribe for, $500 in cash, and the 5 shares of deferred bonus stock. The chief executives have not included themselves in the operation of the plan.

From the $25 a week man, with his stock allotment measured by 10 per cent. of his salary, and his 3 per cent. bonus, to the $10,000 a year man, who subscribes to stock costing 20 per cent. of his salary and receives a bonus with a cash value of 9 per cent., the percentages rise by grades. But everywhere, excepting in half a dozen grades where it just happens differently because of the arithmetic of keeping to integral shares of stock, the employee, high or low, is financed by the company, after some outlay of his own, so that after five years he will have his stock and his money back, with a little more. Curiously, in the case of the lower grades, a little figuring shows that the employee will have his stock and, besides, almost exactly the amount of money he would have if he should put his instalments in a savings bank at 4 per cent.

The business of the profit sharing system is handled by men at the very top of the company. Operating officers are most active in its direct management — the men who have to handle the physical affairs of the industry. They know, as well as men can know in so large and scattered a force, the human nature that is a part of the equation in calculating the effects of such a system.

NO RED TAPE

No red tape is permitted. It is all businesslike, but every transaction with employees is conducted with all the courtesy and respect that is accorded to outsiders who happen to have business relations with the company. Every man's bonus is mailed to him direct. So are the regular dividends on the stock. For the sake of convenience only, the special dividends are credited on the books.

It is made plain to every man that he is perfectly free to manage his part of the profit sharing business to suit himself— so long as he acts in good faith and fairness.

Of course, the men who are looking after the business for the company will not permit anybody just to buy the stock, get the bonus, and sell out. The company has reserved full discretion in all details of the handling of the profit sharing. Any employee can be shut out. As an evidence of its own good faith, the company appointed trustees and every year has turned over to them all the stock that is held for delivery at the end of five years and any funds that become payable to employees in the same way. No change of control or insolvency, even, can, therefore, imperil these. It does not even take back stock or special dividends if an employee quits or is shut out because of unbecoming conduct. Forfeited stock and money is placed in a pool, to be divided among the remaining employees when the year's series closes. In case of death, an employee's deferred stock and all extra dividends for the remainder of the five years are paid to his estate immediately.

FREEDOM OF CHOICE

The men are even told that they need not subscribe to the full amount of stock that they are expected to take, in order to receive the full bonus presented by the company. Any reasonable explanation, such as sickness in the family, emergency expenditures that make it difficult to keep up with payments, even the purchase of a home, has been accepted. There have been very few such requests at the time of subscription; the difficulties usually develop later and are easily adjusted. On this year's allotment, six men who had disposed of stock bought under the two previous offers applied to buy. Of course, the stock they had sold was all paid for and their own in fee simple. Perhaps some of them had no idea that such a small thing as selling their stock would come to the attention of the very highest officers of the company. But it did. And they received, every man of them, a courteous letter direct from New York asking if they would state the reason why the stock had been sold.

Any fair explanation was taken. A fine, manly frankness saved one man who really had no good excuse. The company merely wished to find out if there was any one who was not acting fairly with the company. Any one who was not would simply be told that he couldn't buy this year's stock.

Only one man among those who applied for short allotments and those who had sold their stock was found to have been figuring sharply to make a little more than other employees. He was a man of good salary. He was known personally at the New York office. All he had done was to ask for just so many shares as the free gift from the company would pay for without his having to invest any money of his own. The officers of the company were sorry to discover that he was that kind of an employee.

A CLOSER PERSONAL TOUCH

The officers say that a by-product of their profit sharing, that they had little idea of at the beginning, has been the close personal touch it gives with the employees of the "executive class." It was precisely to find what may be called the "organized" way to bring back into the relations between employer and employed, in the case of an immense corporation, the old personal element that the rubber company's plan was devised.

Two years of the system have already brought results. The general statement is made that the employees like the profit sharing and are noticeably more loyal and active in its interests. That sounds general. There are some specific things to prove it. For years, it has been the policy of the United States Rubber Company to unify its business. It wants to drop the old established trade names of products manufactured by subsidiaries. It has tried to get its employees to talk of the "United States Rubber Company" more and of the subsidiary company names less. It had been a slow process till the profit sharing came. Now the men have suddenly taken to using the company name in every-day talk.

If every one of the 1,200 employees who benefit is not working harder, hundreds are. Even men who do not benefit have improved and are trying to get into the profit sharing class. Superintendents and

heads of departments are continually asking for the advancement of employees nowadays. At first it was a plea that such-and-such a man was too good to be getting only $1,200 when a certain other man was earning $1,300. The company could not advance everybody at once. It resulted in throwing the lime-light on the $1,300 man. This, as well as the desire to get up a grade because the bonus grows so rapidly, put more energy into him. The new system brought pressure upon bosses and superintendents through the insistence of ambitious men to get ahead. They were compelled to weed out slow-going fellows whom they had good-naturedly let remain as fixtures. They cannot keep an incompetent man in a job now — his job is needed for somebody who is willing to work hard in it. The records of the company show a noteworthy increase in dismissals and in readjustments of salaries upward and downward.

SOME PRACTICAL RESULTS

Also, there has been a decrease in resignations of good men to get better salaries elsewhere. They come frequently to officers of the company to talk it over.

"I want to stay here," says one, "I like this company. But those people have offered me $500 more and in justice to my family I don't see how I can refuse it."

"In justice to your family look at this," replies his adviser. And he gives him some figures with a pencil and pad. For a $5,000 man a $500 increase elsewhere proves no bait at all. He will be getting it in his rubber company dividends alone within a very few years, to say nothing of the stock which he will own outright. He remains with the rubber company. Cases where men's salaries must be increased in order to keep them are much rarer than they used to be. The money saved to the company in this way is considerable. The company prefers to let its salary increases represent the reward of increased efficiency resulting from the stimulation of the profit sharing.

The employees like the system. Practically every one who was eligible applied for stock this year. One of the trustees for the deferred stock made a trip to every factory and store, early in the year, to see for himself how the plan was working. Everywhere men told him that the profit sharing had given them their first savings. To be holders of corporation stock with dividends coming is a matter of pride with them.

The rubber company is not only anxious that the employees shall be directly interested as stockholders in the rubber company itself. It is the desire of the company that they shall catch the investment spirit. It will not be surprising if, in a few years, when the dividends for the accumulation of the company's own stock by an employee becomes large enough to take from him the necessity of putting his own money in at all, some plan for encouraging diversified outside investments by the employees will be advanced.

A STABLE BODY OF EXECUTIVES

The future efforts are summarized thus by one of the men who had most to do with working out the rubber company's plan:

"The people who come after us here as executive heads of the company will be the ones to enjoy the full benefits of this system if it shall continue. Its results will be progressive. Think of these 1,200 employees after a dozen years. They will all be substantial property owners. Everybody knows what owning property does in developing responsibility in people. They will have a direct interest in the company. An insult to it will be an insult to them. They will be a capable lot. Disloyal or incapable people won't be permitted to remain with them. It will be a great advantage to have the company's minor subordinates all recruited from such material."

The whole purpose of the rubber company's system is to organize managerial efficiency, and there is a big significance behind that purpose.

TO HIRE MEN BY MACHINERY

THE REMARKABLE RESULTS OF MR. O. V. FRY'S PSYCHOLOGICAL TESTS OF ENGINEERS OF THE PENNSYLVANIA RAILROAD, WHICH SEEM TO PROVE THAT IT IS POSSIBLE TO FORETELL WHETHER OR NOT A MAN CAN LEARN TO DO THAT KIND OF WORK EFFECTIVELY — A DEVICE TO PREVENT MISTAKES IN CHOOSING A VOCATION

BY

ARNO DOSCH

IN AN inconspicuous car on a railroad siding at Altoona, Pa., the value of psychology in picking a man for a job has recently been successfully established. Tried locomotive engineers were brought before Mr. O. V. Fry, a psychologist, who had never seen any of them before, and, after a few minutes, he was able to give as complete an account of their fitness for their peculiar tasks as the superintendent of the railroad who had known some of them for twenty years. Men whose qualifications were pretty well understood were selected for the test, as the value of the test, rather than the efficiency of the engineers, was on trial.

To those who saw the tests, particularly the engineers who were placed under its pitiless scrutiny, it must have appeared like a revival of the black art, as the tests were made by the use of weird changing lights on revolving disks and the rapid touching of buttons. Yet it was a modern device, the invention of the psychologist. He had made it for the particular purpose of testing locomotive engineers. It was able to record to the thousandth of a second the speed and certainty with which the changing lights reacted upon the minds of the engineers, and it made possible surprisingly accurate estimates of their reliability, courage, behavior in sudden emergency, and their general fitness for the responsibility of running trains.

The locomotive engineers who were selected were men whose strength and weaknesses were already on record. They were also known personally to Mr. G. W. Creighton, general superintendent of the Pennsylvania Railroad, who had not arrived at his position without becoming a first rate judge of men. He knew what those engineers could be counted upon to do, and he had long experience on which to base his belief. Still, he said, in making a report of the experiments, that the machine made the differentiation in the qualities of the men better than he could.

Mr. Creighton also played a trick on Mr. Fry. One of the engineers looked to be an entirely different man once he had washed his face and put on his street clothes. So Mr. Creighton sent him into the test-car one day just as he came in from a run in a greasy jumper and with dirt smeared across his face, and several days later he sent him in again fresh from the barber and in his street clothes. To Mr. Fry and the other men assisting him in the test he was another person. They were at first completely deceived. But as soon as they began making their deductions from his reactions to the test they discovered he had reacted to the impressions on the two days with a speed and accuracy that were identical. Then, knowing that no two men are exactly alike, Mr. Fry asked if he had not been put to a test before and found that he had. Meanwhile, however, he had rated the engineer's efficiency and had necessarily given him the same percentage that he had showed in the previous test.

This test at Altoona was, of course, by no means the first application of psychology to practical ends. Professor Hugo Münsterberg, of Harvard University, has made a number of interesting experiments in this country. He carried on a successful series of experiments to de-

termine the qualifications of street car motormen in New York, and he made another equally successful test of telephone operators in Boston. But he was not checked up as Mr. Fry was. He was a recognized authority on psychology and his findings were accepted without question. Mr. Fry was in a much less authoritative position. He is a grocer in Altoona. He has strong leanings toward psychotechnical research and had previously shown a good deal of ability in that direction, but it was only natural for him to be regarded at best as an amateur. The idea of a psychological grocer might also lend itself to the humorous. Mr. Creighton, however, does not appear to have let the incongruity deter him, and it was at his request that Mr. Fry made the tests. He had in mind the purpose of founding a regular system for the psychological examination of applicants for railroad positions. This he has not yet carried out, but he has made the first definite move in that direction by proving the value of Mr. Fry's efforts.

The accuracy of the tests at Altoona is their most important result, as it holds out the hope that psychology will be used on a large scale in the selection of vocations. But it is hardly less interesting that Mr. Fry found it necessary to develop a machine peculiarly adapted to the testing of railroad engineers. It was his original purpose to copy or change slightly the machine that Professor Münsterberg had devised for the selection of street car motormen, but he found it would not do. Professor Münsterberg's machine was made to show the quickness of motormen in controlling their cars in streets where there is a constantly interfering traffic. The fitness of the man for the job in this case is largely dependent upon his promptness in stopping and starting his car. He must be able to judge the speed of half a dozen different kinds of interfering vehicles and, at the same time, not become so engrossed that he will lose so much as a tenth of a second in stopping his car if a child chances to wander out upon the track. He must also respond promptly to the conductor's signals. The qualifications of the railroad engineer are quite different. The right of way is practically unobstructed and stops are infrequent. The chief requirements of a locomotive engineer are quickness and accuracy in reading signals and coolness under the stress of sudden emergency. Entirely different machines were required for the two tests.

Professor Münsterberg's machine was a small model of a busy street with various mechanical devices representing dangers and signals of all kinds. It was a very clever machine, and experienced motormen who operated it said it gave them the exact sensations they experienced in running their cars. By the turning of a handle which moved a piece of glass, representing the car, past the various dangers and emergencies, the motormen undergoing the test showed their fitness just as well as they would have shown it to Professor Münsterberg if he had stood beside them on their car-platforms and had been provided with the recording devices that the machine possessed. It was better than an actual test because it was able to record nerve reactions with absolute accuracy.

But when Mr. Fry studied this machine, he found it would not do for his purpose. He had to develop something quite different. He was on new ground, but he took a cue from Professor Münsterberg's experiments with telephone operators and did not attempt to reproduce actual conditions. He confined himself to the testing of psychological reactions, and found that this was sufficient. This is of considerable importance, because Professor Münsterberg has expressed the fear that the application of psychology will lead to the multiplication of mechanical devices to a hopeless variety. Mr. Fry's device is an effort in the direction of simplifying and standardizing psychotechnical apparatus. Just how useful it may prove in testing the adaptability of men to other kinds of work is yet to be seen.

A MACHINE THAT REVEALS THE MIND

The story of the tests can be most easily told by describing this machine. The apparatus from which the man undergoing the tests derives his impressions is, essentially, simply a polished disk a foot in

diameter upon which appear two rings of colored light — one ring inside the other. The outer ring is eight inches in diameter, but the band of light itself is only one inch broad. The inner ring is only four inches in diameter, but its band of light is one and a half inches broad. The light of the inner circle, in other words, is more conspicuous. The operator can vary the color of these rings at will. The outer ring he can make appear as white, red, yellow, amber, green, blue, or purple — approximately the range of the spectrum. The inner ring he can make appear as red, green, or white — the standard railroad signal colors.

The speed and accuracy with which the engineers saw and remembered the lights in the inner circle as they were manipulated by Mr. Fry showed their efficiency, and it speaks well for the men selected that in a group of seventeen the average of efficiency was 92 per cent. Each one as he was tested was seated facing the disk with a key-board handy to his fingers. The keys were for recording red, white, and green, and probably those three familiar colors had never been presented to them in such a bewildering and unexpected number of ways. But whatever their reaction was to them, as shown by the touching of the three keys, was recorded for time and accuracy.

The most important part of the apparatus is the recording device. It has seven magnet-controlled pens which register the whole process on paper, where it can be examined at leisure and figured out to a mathematical certainty. One pen connects with the clock and records the time. Three pens indicate when the man who is operating the machine turns on the red, white, and green lights in the inner circle on the disk. The three others show the reaction of these colors in the man who is undergoing the test. They show to a thousandth of a second when he touches the three buttons in front of him.

The apparatus requires three men to operate it, and its use involves a good deal of mechanical detail that is not necessary to the understanding of the machine. The principal point about it is the certainty with which it records the reaction in the individual.

There are four parts to the test, and from these, combined with a close scrutiny of the individual under action, the results are obtained. It is all based on color, but not, however, for the reason one would naturally infer. Mr. Fry confined himself to color because, as he says, locomotive engineers always consider color first. In the twilight, for example, when an engineer might read signals either by the position of the semaphore or by the color it displays, he sees the color first.

THE FOUR PSYCHOLOGICAL TESTS

In the first part of the test various combinations of the three signal colors are shown in the inner circle on the disk, as red and green at the same time, or white and red. The engineer who was undergoing the test was required to register on his keyboard the more restrictive of the colors that he saw — red being the most restrictive signal, green the next, and white the least restrictive. Thus, if white and green appeared, the engineer should register green. This is called the elimination test.

The memory test which follows is a simple matter. Three, four, five colors are flashed in order and, when the operator says "Record," the man he is testing indicates the order in which his memory records their appearance by touching the corresponding keys in front of him.

Of the two remaining tests it is hard to say which is the more important. The man who makes a good showing in both of them has proved his qualifications for running trains. The first is a straight test of reaction. The disk is set in motion, the speed changing constantly at the caprice of the operator. Meanwhile the lights are flashed on and off. The subject of the test is required to touch his three buttons as the lights appear.

To a man who is not accustomed to using his hands at mechanical work the results of this test are likely to be poor. The nervous system is not able to react fast enough. The two fatal tendencies are to put down colors in the wrong order or when they do not appear at all. This might be called the test of the "man of his hands." If he cannot make a pretty

fair showing in this test he has no right to be a locomotive engineer.

QUICK WORK IN JUDGING COLORS

The last test shows Mr. Fry's cleverness as an experimental psychologist. As every one knows who has ridden in an engine cab, when it swings into a crowded terminal there is such an elaborate display of signals that no layman can possibly understand them. But the man at the throttle watches for his own signal and responds promptly to it. Otherwise the great modern terminals would be scenes of constant confusion. To be able to pick out colors, then, is highly important. I am not making any reference here, of course, to color blindness, for a man who is color blind is never allowed to become an engineer at all. This test is to show his quickness in picking out colors.

The possibilities of the disk are here used in their fulness. First, the outer circle of lights is placed in operation, with the colors constantly changing in a very confusing manner. Then, unexpectedly, colors flash on and off in the inner circle. The subject of the test must record with his buttons when and in what order the colors show in the inner circle.

THE TEST OF CHARACTER

To make the test even more trying, at some time when the engineer is straining his attention to keep up with the shifting colors, the operator flashes red, unexpectedly calling out "white," and one of the other men answers him "white." If the subject is not pretty sure of himself, in spite of himself and before he can control his own actions his finger presses the white button. Then, before he has time to recover from the momentary confusion, the operator flashes white, calls "white" and is promptly answered "white." It is all done very quickly and is a marvelous test in action. An engineer who keeps his head through it and records both promptly and correctly can be counted on in any emergency that may arise.

During the entire test nothing that passes through the subject's mind in relation to the colors fails to be recorded. The test is absolute and final. But here is an interesting angle to it. Some of the best engineers did not come up to expectations, and this is a reflection neither on them nor on the machine. If they had come as applicants they might have been refused a job, but they had the character to overcome their defects. This shows that character must be taken into consideration. Mr. Fry confined himself to reading character in the faces of the men as they sat under his observation. With younger men, applicants for positions, character would not show so plainly on their faces.

ONE LIMITATION OF THE TEST

As the purpose of Mr. Creighton in making the test was to find an effective way of using psychology in the choosing of applicants, rather than testing the men already in service, this question of character is yet to be settled. It is doubtful whether the psychologist examining applicants will ever be able to say, "This is a good man, in every way fitted for the job." He can eliminate many who are not fitted for the work, whose unfitness can be shown only by psychological tests. As for those he passes he will need a finer test for character than any that has been devised, or he will have to leave it to experience. The great service of psychology is in keeping square pegs out of the round holes. Some of the round pegs that fit in the holes may develop weaknesses of character.

During the tests Mr. Fry found out a number of things for himself. "One of the most interesting things to me," he said of the test, "was the consistent way men reacted again and again to the same tests. I had one engineer before me on six different days and the differences in his reactions from one day to another could be shown only in one hundredths of seconds.

"The engineers, I was glad to find, considered the test effective. One of them compared the machine to the appearance of the road when rounding a curve just before entering a station. Picking out the lights on the disk was to them no more difficult than selecting their own signals from the confusion before them.

"We all expected before we made the test that the quickest reaction would be on the color red. Instead, it was on white.

The average of tests showed a reaction on white quicker by $\frac{136}{1000}$ of a second."

Here is a sample report made by Mr. Fry after a test of an engineer named as "C", who was given an efficiency rate of 92 per cent:

"A very slow man. Always safe, but has no record for speed. A little slow at grasping details but, once he has them, he will remember them readily. Rather combative, of fair executive ability, but his speed, or rather lack of speed, is, in this case, too much of an asset. This man is possibly very good at slow, sure work, but he will surely cause delay where speed is the requisite. The man in test letter 'B' will accomplish the same work in less time and with the same element of safety."

In a broad, general way, after understanding the machine, you can grasp how Mr. Fry came to these deductions. The actual record of the man's tests, if not too voluminous to print here, would make this even plainer, but after examining the record myself I had to confess there was a gulf of reasoning I could not safely cross. Speed and accuracy, of course, are shown very plainly. Memory is also susceptible of exact record. Combativeness and executive ability might, or might not, show. When I questioned Mr. Fry on these points he admitted there was a gulf of deductive reasoning, but he felt that he knew how to cross it. However, the latitude is not as wide here as it might appear. Taking the list of tests, he ran over them for points of this kind. In one case he spoke of a man as being only average good and likely to make mistakes under ordinary circumstances. In an emergency he thinks this man will be excellent. This is the reasoning by which he arrived at the conclusion:

THE EMERGENCY MAN

In the test this engineer made a run of mistakes and then a run of correct answers. This showed him to be excitable. But when the record showed that he did better under the stress of the more difficult tests, it was plain he was an emergency man. In another case, as speed and confusion increased, the engineer's mistakes increased out of proportion. Obviously he lost his head in an emergency. He could not think quickly.

Mr. Fry said of one man that he was affected by reading of wrecks and might be positively dangerous on the road after a fatal accident. I asked him where he got that deduction, and he explained that the engineer in taking the test always became confused and made a series of mistakes immediately after making one mistake. The consciousness and memory of the one mistake threw him off his balance.

Just how much deductions of this kind are worth depends upon the reasoning power of the psychologist who is making the test. But there is no question at all about the value of the obvious deductions. For example, in that last difficult test, if a man records the appearance of the lights correctly, or anywhere near correctly, considering the speed and confusion, and the interference of the operator himself, he shows that he has a reaction sufficiently sure to make an engineer of him. If he is also quick at it he is a man fit to run express trains.

The man who watched these tests most eagerly was Mr. Creighton. As the general superintendent of a railroad he must be able to judge men. Evidently he has come to the conclusion that ordinary observation is insufficient, although he was plainly pleased to find his own judgment vindicated by the psychological tests. But he feels the need of a better test, and he sees that it lies in psychology. He is trying to establish a system of psychological tests for applicants. He does not purpose to test the men who are already in his employ. He feels that he knows them pretty well already, and the test of the engineers shows that his observation is good. At the same time he has undoubtedly frequently found it necessary to get rid of men who were unfit for their jobs. This is a painful task. No one likes to discharge a man who is doing his best. These unfit men would never have been hired if a psychological test had been used on them, as they would have revealed their unfitness. That is the service which psychology hopes to do for all forms of industry.

THE MARCH OF THE CITIES

SEATTLE MAKING A PROFIT FROM THE DISPOSAL OF GARBAGE

MOST American cities have considered the disposal of garbage a dead loss. That it was possible to earn a profit from garbage disposal seemed out of the question. Yet, within the last year, Seattle, Wash., has demonstrated that a city can make — not lose — one fourth of a million dollars from this source.

About a year ago, Dr. James E. Crichton, who was then Commissioner of Health of Seattle, hit upon a plan that has since been carried through with remarkable success. The daily production of garbage in Seattle is more than 400 tons; and, before the adoption of Dr. Crichton's plan, this garbage had been collected from every point in the city and carted to the incinerators, there to be destroyed. The great expense of cartage had forced the city to erect several incinerators in the very heart of the best residential sections of the town.

At the same time much of the low-lying land of the town was unfit for habitation. Dr. Crichton's idea was the "sanitary fill." Choosing a piece of swampy land on the outskirts of the city, he directed that all garbage be dumped upon one corner of the property. Working out from this pile, the garbage was then spread out to a uniform depth of three feet, until the pile had been quite removed. Over the three foot stratum an antiseptic spray, composed of crude carbolic acid, resin, and caustic soda, was applied, thus killing all eggs or larvæ of flies, mosquitoes, and any other insects that might there find a favorable breeding ground. The spray, however, did not exterminate the bacteria. Thus, day after day, the waste was spread and sprayed until the tract was covered.

The second step in the process was to cover the whole mass of garbage with very porous earth, coarse sand, or, best of all, crushed clinker and ashes that allowed the buried material to be flooded with the greatest possible amount of air.

The admission of air aided and forwarded the disintegration of the garbage by the stimulation of bacterial action and, to a lesser extent, by oxygenation. Much moisture and warmth and the shielding from the direct rays of the sun excited the necessary action of the bacteria; the moisture being supplied either naturally or artificially in a drought, and the warmth being furnished by the constant chemical change proceeding within the mass.

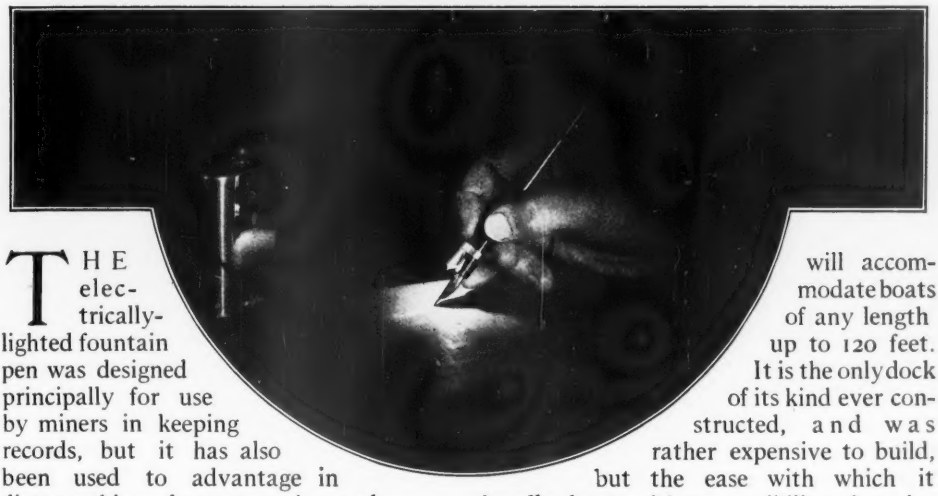
To the chemical and bacterial action was added the efficacious medium of oxygenation. A peculiar method of collection of waste was employed as an auxiliary to this process: Boxes, cans, barrel staves, bottles, straw, and paper were scattered throughout the garbage, thus providing plenty of space for the circulation of air. A mass of garbage would have proved too compact to admit of any material amount of oxidation; but under this method the process was so rapid that at the end of three months even the largest tin cans had completely disappeared. This was proved by the sinking of a shaft twelve feet deep right in the middle of the waste; for this experiment proved that not only had all animal and vegetable matter returned to its earthy components, but that even the strongest iron hoops and nails had vanished.

Over the whole tract grass seed was then sowed, so that the new acreage betrayed no evidence of its previous condition.

Within the year the land so saved, or made, has been greatly enhanced in value; and the incinerators, with their costly running and construction expenses, have been practically dismantled.

The work can be carried on upon a much smaller scale and still furnish a handsome profit to the municipality employing it. Already Aberdeen and Hoquiam, Wash. — both centres of less than fifteen thousand population — have abandoned their projects for the construction of incinerators and have adopted Dr. Crichton's method.

MAN AND HIS MACHINES



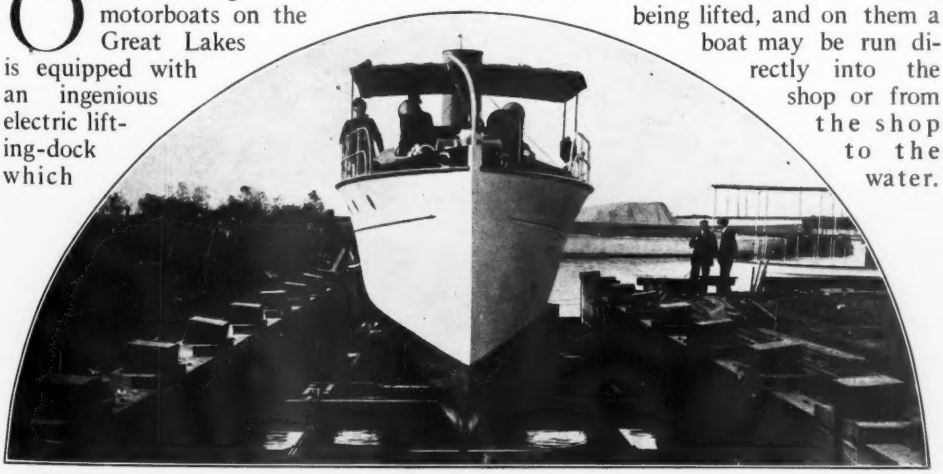
THE electrically-lighted fountain pen was designed principally for use by miners in keeping records, but it has also been used to advantage in dictographic and secret service work.

The small electric bulb is protected by a metal cover and is mounted on a circular prong which can be fitted over various sizes of fountain pens. A silk-covered wire connects the bulb with a small pocket-type battery. The light that the bulb gives is reflected directly upon the point of the pen.

ELECTRIC LIFTING-DOCK

ONE of the large concerns that build motorboats on the Great Lakes is equipped with an ingenious electric lifting-dock which will accommodate boats of any length up to 120 feet. It is the only dock of its kind ever constructed, and was rather expensive to build, but the ease with which it handles boats without possibility of straining them has made it a practical investment.

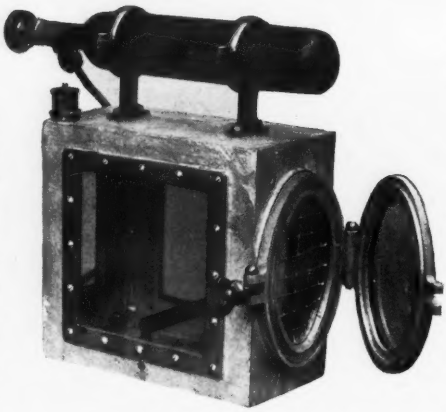
A 15-horsepower electric motor does the work. The power is transmitted by two line shafts to twenty screws that are placed in indentions on the sides of the retaining walls. The dock is 100 feet long, 20 feet wide, and 14 feet deep. Ten I-beams, that are lifted and lowered by the twenty screws, carry a track which is provided with three separate trucks. These trucks may be so spaced that they reduce the strain on the boat when it is being lifted, and on them a boat may be run directly into the shop or from the shop to the water.



A DOCK THAT LIFTS BOATS BY ELECTRICITY

RAISING THEM OUT OF THE WATER QUICKLY AND CHEAPLY FOR REPAIRS

RESUSCITATION CAGE FOR MINE CANARIES



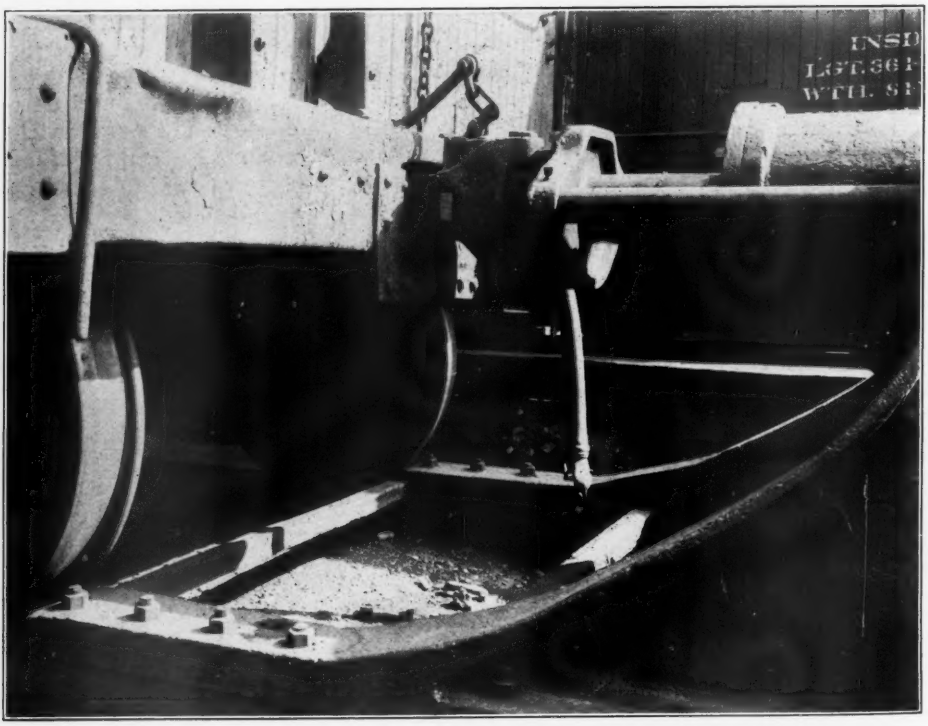
A CAGE FULL OF OXYGEN

TO REVIVE CANARIES THAT ARE OVERCOME BY GAS IN COAL MINES

CANARIES and mice are often used by the men entering a mine after an explosion or fire. These little animals, being more sensitive than man to carbon monoxid in the atmosphere, will give quick indication of the presence of this deadly and odorless gas.

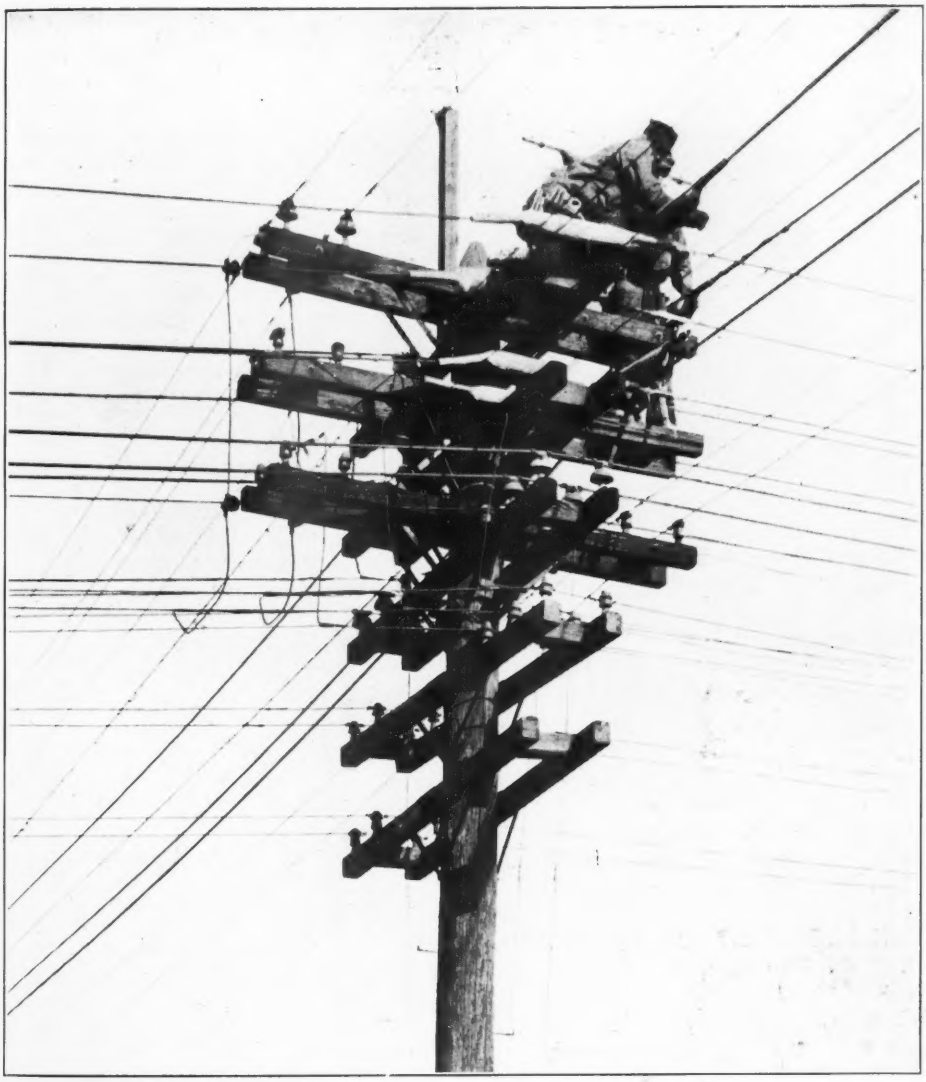
Usually, in the past, the canaries or mice have been taken into the mine in ordinary cages, but, since the use of a canary or mouse so carried is entirely lost if it is once rendered unconscious and cannot be quickly taken to the surface or to a part of the mine where the air is fresh, a special cage has been designed which can be made air-tight, and which is provided with a supply of oxygen. If the canary or mouse has not been exposed to too deadly an atmosphere, the closing of the cage and the flow of oxygen will result in an immediate revival. Excess pressure of the oxygen upon the canary is prevented by means of the escape vent that is located at the top of the cage near one of the rear corners.

The small oxygen cylinder also serves as a handle for the carrying of the cage.



A PNEUMATIC BUFFER

THAT STOPS CARS FROM RUNNING OFF THE END OF THE TRACK ON SIDINGS AND AT RAILROAD TERMINALS



SAFE IN THE MIDST OF ARTIFICIAL LIGHTNING
THE LINEMEN ARE PROTECTED FROM HIGH CURRENTS BY RUBBER SHIELDS

PNEUMATIC CAR BUFFER THAT SLIDES

THE distinctive characteristic of this pneumatic car buffer, in comparison with the ordinary railroad bumper, is that it is not stationary. It is attached to a section of inverted U-shaped rail 106 feet long, with tapered ends. The whole contrivance simply rests on the track rails. When a train runs on to this rail section and hits the buffer, the air cushion absorbs the initial shock and the whole apparatus slides until the train's momentum is overcome by the friction of sliding rails with track rails.

Should a train run "wild" into a terminal station that is equipped with this buffer, it would shove the buffer back on the platform, with the weight of the engine and tender resting on the sliding friction rails.

A DIME-IN-THE-SLOT PARCEL CHECK ROOM
THAT SAVES TIME AND TIPS IN THE STATIONS OF A RAILROAD THAT RUNS OUT OF CHICAGO

RUBBER SHIELDS PROTECT LINEMEN

DOING repair work in a maze of electric wires at the top of a pole is ordinarily a dangerous task unless the current is turned off. Thousands of tests, however, under actual working conditions, have shown that the ingenious wire shields that are shown in the illustration on page 475 make it fairly safe for men to work on high tension lines without shutting off the current.

These shields, which can be applied to wires and cross arms in a large variety of positions, are made of rubber, and are so shaped that when a shield is in place no "live" part of the circuit is within the danger zone of the lineman. In placing a shield around the wire the lineman grips it by rubber handles that are attached to the outside so that the shield is between his hands and the wire. The shield fits over the insulator as well as over the wire. A hard rubber ring, slotted, with an opening sufficiently large to admit the wire, serves to clamp the shield securely to the wire. It is safe to use the shields on wires carrying loads not in excess of 10,000 volts. Each shield is subjected to a submerged test of 30,000 volts before it is allowed to leave the factory.

COIN-CONTROLLED PARCEL LOCKERS

AUTOMATIC coin-controlled parcel checking lockers have been installed in all the stations of one of the great railroad systems that run out of Chicago. These locker cabinets, which are all steel, are made in three sizes, and they contain eight, twelve, or sixteen lockers apiece.

The person who wishes to check a bag, suitcase, or parcel walks up to the cabinet, selects a locker that has a key in its lock, which shows that it is vacant, opens the door, places the baggage inside, closes the door, drops a ten-cent piece in the slot, and turns the key to the right and withdraws it. The key, which is numbered to correspond with the compartment, is carried away by the person who uses the compartment. When this key is inserted in the lock for the removal of the baggage it cannot again be withdrawn until another coin is inserted in the slot by the next user of the compartment.

AN ELECTRICAL SUBURB

IN WILDWOOD, a suburb of Toledo, O., electricity is used exclusively for cooking and general domestic purposes. In this suburb, which is being developed by a real estate company, electricity is sold at a flat rate of $3.50 a month for a consumption of 100 kilowatt hours.

The illustration shows a typical kitchen in Wildwood and the type of stove that is used. This stove is constructed on the principle of the fireless-cooker. The current is turned on automatically at the desired hour by means of the clock attachment and is automatically tripped off when the desired heat is obtained. This arrangement permits the housewife to prepare a six-o'clock dinner in the morning, take luncheon downtown, and, if she wishes, to attend a matinee or make social calls in the afternoon. On returning home she will find the dinner cooked, without any excess consumption of electricity.

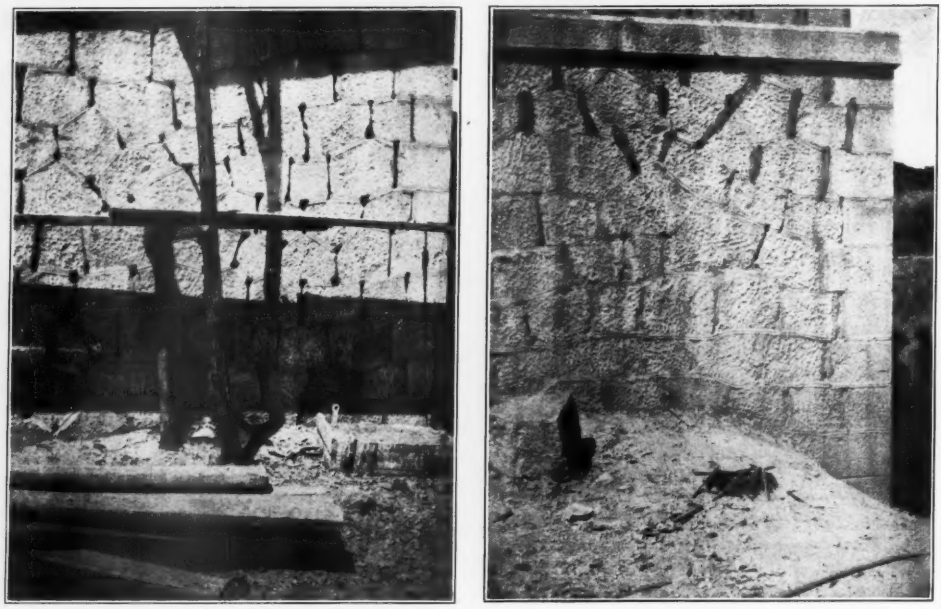
WHERE DINNER COOKS ITSELF

THE AUTOMATIC ELECTRIC RANGE CAN BE SET TO HEAT AT ANY TEMPERATURE FOR ANY LENGTH OF TIME

"SHOOTING" CEMENT MORTAR

THE cement gun, a device for "shooting," under pressure, a coating of cement mortar on to brick, concrete, wood, steel, and like construction surfaces, is being used for many new and interesting kinds of work. One of the important tasks it has had to perform was the cementing together of the stones in the piers of a Spanish aqueduct. In making the original mortar for these piers the cement was poor in quality, and as a result all the filling was washed away. It became necessary to tie the piers up by means of cables to keep them from falling. Then the cement gun was used to "shoot" cement between the stones to bind them together.

The gun is operated by compressed air, furnished by a compressor which is a separate unit of the outfit. The cement mortar, which has been previously mixed dry, is thrown into the receiving hopper at the top of the gun, compressed air is admitted, the weight of the material causes a valve in the bottom of this hopper to open, the material drops into the lower hopper, and then the lower valve is closed. A feed wheel at the bottom of this hopper discharges measured quantities of material into a stream of compressed air which



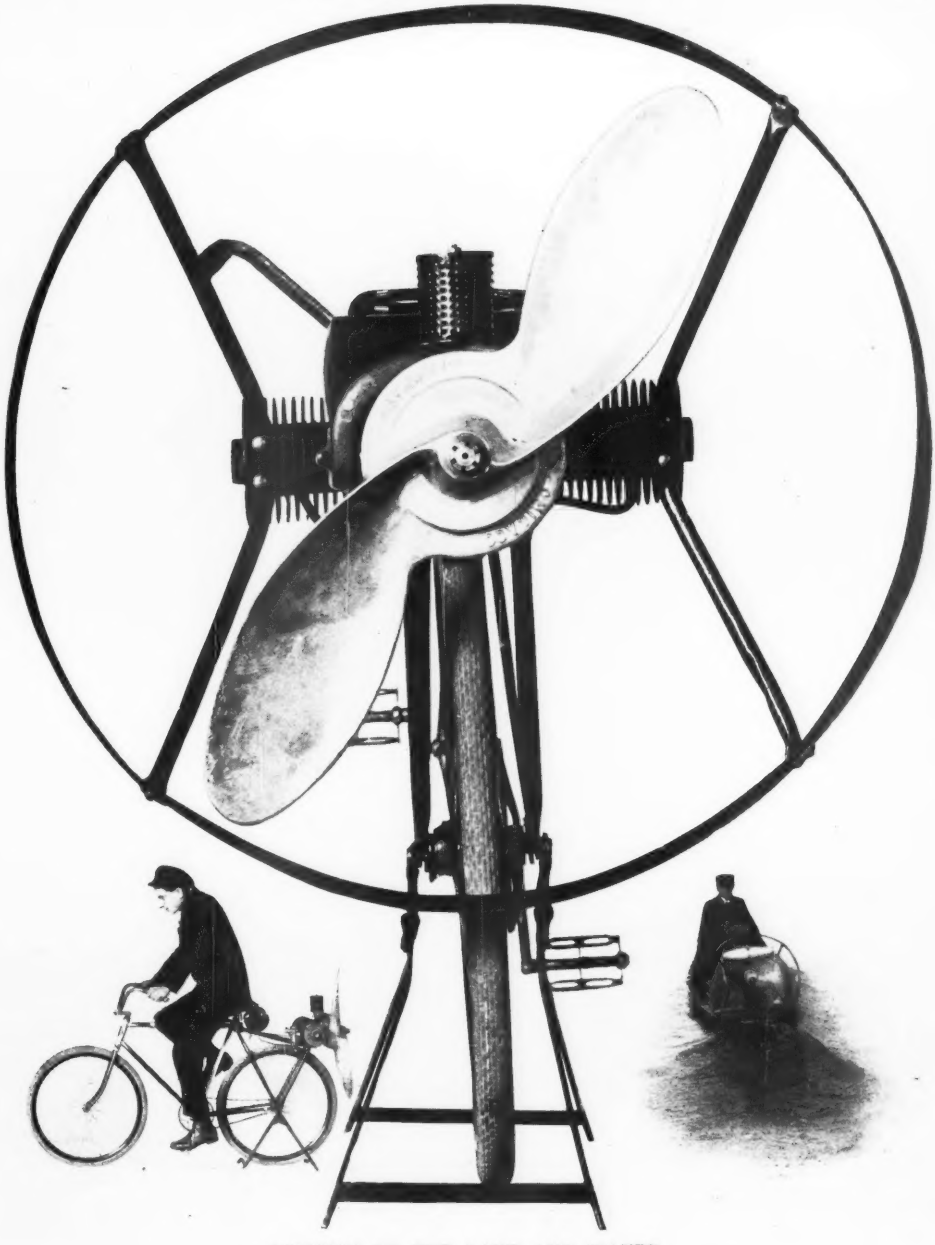
A PIER THAT WAS "SHOT" TOGETHER

BEFORE AND AFTER THE CREVICES BETWEEN THE STONES WERE FILLED WITH CEMENT FROM THE "GUN"

blows it through a delivery hose. This delivery hose may be 300 feet long, and at its end is a rubber-lined metal nozzle which is also connected to a water hose so that a fine spray of water is added to the material as it rushes through the nozzle.

"SHOOTING" CEMENT FROM A HOSE

DRY CEMENT IS EXPELLED FROM ONE PART OF THE NOZZLE AND WATER FROM ANOTHER, AND THESE TWO ELEMENTS MIX IN THE AIR AS THEY ARE DRIVEN INTO PLACE



AIRSHIPS OF THE LAND AND WATER

A BICYCLE AND A BOAT THAT ARE DRIVEN BY AËRIAL PROPELLERS

A LIGHT AIR PROPELLER

AN INGENIOUS little aërial propeller for the propulsion of small boats, bicycles, and ice boats is now being extensively demonstrated. The illustrations show the apparatus installed on a bicycle and on a rowboat.

The total weight of the engine, with its accessories, is about 28 pounds. The propeller and magneto weigh 16 pounds, all but 2 pounds of which rotates, thus

ADDING AND SUBTRACTING BY ELECTRICITY

THE OPERATOR IS THUS RELIEVED OF THE TASK OF CONSTANTLY PULLING A LEVER

affording an abundant flywheel effect. The propeller, which is cast of one of the lightest and strongest aluminum alloys, is 32 inches in diameter. The motor has a speed range of from 1,300 to 2,500 revolutions a minute. At 2,000 revolutions a minute a full 3-horsepower is developed. A demountable guard encircles the propeller.

An ordinary bicycle equipped with this outfit will make a speed of 25 to 30 miles an hour under ordinary conditions. The installation has no connection whatever with the pedal propulsion, which can be used if the engine is not running, or it can be used to supplement the power of the motor, if necessary, on heavy uphill grades.

A simple clamp is used to mount the outfit on the stern of a boat or ice sled. A set of universal steel tubular mountings is supplied for attachment to a bicycle.

A NEW CALCULATING MACHINE

A CALCULATING machine that adds, multiplies, divides, and subtracts is in itself of much interest, but the most novel characteristic of this machine is that it is electrically operated. This does away with the turning of a crank and a lever. All the operator has to do is to manipulate the keyboard.

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